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PATIENT SATISFACTION WITH NURSE PRACTITIONER DELIVERED
PRIMARY HEALTH CARE SERVICES

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Human Resource Education and Workforce Development

by

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Abstract

The purpose of this study was to explore and determine the degree of client satisfaction with utilization of primary healthcare services delivered by a nurse practitioner in the Employee Health Services department of a not for profit hospital in the Southern United States. The Nurse Practitioner Satisfaction Survey (NPSS), a 28-item Likert-type survey instrument was specifically developed for this study and administered to a sample of 300 clients.

Overall high levels of patient satisfaction with nurse practitioner delivered health care services were demonstrated. The mean general satisfaction score was determined to be 86.86 / 90, with mean communication and scheduling subscale scores of 28.16 / 30 and 19.32 / 20 respectively.

Factor analysis of the dataset resulted in a three-factor model that explained 70.77% of the variance. Eighteen variables with loadings ranging from .916 to .391 loaded on factor one, general satisfaction. Six variables with loadings ranging from .888 to .435 loaded on the second factor, communication satisfaction, and four variables with loadings ranging from .535 to .748 loaded on the third factor, scheduling satisfaction.

No statistically significant differences in scores on the general satisfaction subscale were noted between subjects based on gender, race, age, highest educational level completed, type of health care coverage, yearly net income levels, patient type, employment status, or degree of illness or injury. Married or cohabitating subjects, however, reported general satisfaction subscale scores that were statistically higher than those who were single and never married.

Multiple regression analysis of the dummy coded variables gender, age, income, and highest educational level as possible predictors of general satisfaction subscale scores revealed that subjects reporting some college attendance demonstrated scores which were -2.243 points lower than those of the other educational levels. Additionally, being a member of the 18-25 year old age group resulted in a decrease in communication subscale scores of -1.194 points, while being a member of the masters level educational group resulted in increases of 1.387 points. Further analysis revealed that scheduling satisfaction scores for subjects in the 18-25 year old age group were $-.954$ points lower than those reporting ages above 18-25 years.

Chapter 1

Introduction

Rationale/Justification

Healthcare costs have increased exponentially in recent years for both individual healthcare consumers and employers providing health care benefits for employees. Companies with self-insured/self funded health plans are particularly cognizant of the high cost of insurance and healthcare.

Healthcare comprises approximately 1.4 trillion or 15% of the Gross Domestic Product (Center for Medicare and Medicaid Services, 2005). In 2002 businesses paid an average of \$6300 per employee, over 42.3% of payroll expenses for medical benefits (United States Chamber of Commerce, 2004). Employee illness is very expensive for employers, in terms of both cost of healthcare services as well as time and lost workplace productivity resulting from employee job absences for infirmity and healthcare provider visits.

Both employers and employees benefit from the provision of accessible, on site, comprehensive healthcare in the most cost effective and efficient methods possible. Extensive documentation indicates that for most healthcare situations, prevention and early access to care is more cost effective. Therefore, there has been rapid growth in programs placing emphasis on wellness, prevention, and early access to care (United States Preventive Services Task Force, 2003).

The establishment of on-site health care services is an issue that has been of increased interest in the health and wellness arena, especially among self-insured organizations. The expansion of employer provided healthcare services to family

members of employees extends the promotion of employee wellness and health care participation beyond the workplace and into the family arena, thus enhancing provided employment benefits for both employees and employers. Unfortunately, the cost of maintaining a full time physician is prohibitive for most organizations (Lugo, 1997).

An alternative is the use of a nurse practitioner to provide on site health care services within an organization. Nurse practitioners are competent, safe, and cost effective providers of primary care healthcare services who produce outcomes that are comparable to or better than similar care received from physicians. Nurse practitioners improve access to care by providing cost effective, quality health care services in ambulatory settings (McGrath, 1990). According to The United States Congress, Office of Technology Assessment (1986), “ the weight of evidence indicates that within their areas of competence, NP’s, PA’s and CNM’s provide care whose quality is equivalent to that of care provided by physicians” (p.5).

Nurse practitioners are legally licensed to provide primary health care services and wellness and prevention activities, including assessment, diagnosis, and treatment of acute and emergent, as well as chronic health care alterations. Nurse practitioners emphasize health promotion and disease prevention and are capable of ordering and interpreting diagnostic and laboratory tests as well as prescribing pharmacologic agents (American Academy of Nurse Practitioners, 2002).

Entry-level academic preparation for the nurse practitioner is a master’s degree. Nurse practitioner programs include extensive clinical and didactic content to assure clinical competency in patient management. Nurse practitioners practice both

autonomously and in collaboration with physicians to insure optimal health care outcomes (Louisiana State Board of Nursing, 2003).

Consumerism has become an important concept in the United States, with employers, employees, and families functioning as active consumers of healthcare who no longer view themselves as passive recipients of services. As active consumers of healthcare services, patients increasingly desire active participation in decisions regarding health and wellness (Larrabee, 1996).

Cox's Interactional Model of Client Health Behavior (IMCHB) states that healthcare clients are unique, complex, and dynamic composites of demographic characteristics, social influences, personality traits, motivation, emotion, and worldliness. These components serve to influence ultimate client health behavior and decisions. Client satisfaction with care is an important indicator of perceived quality of care that exerts an influence on patient health outcomes. The perception of satisfaction with care and healthcare services received is often a determinant of eventual compliance with medical regimen and health outcome (Alazri & Neal, 2003). As consumers of healthcare, patients are generally highly satisfied with care and services delivered by nurse practitioners (Larrabee, Ferri, & Hartig, 1997).

Enhanced patient satisfaction with on site nurse practitioner delivered healthcare results in improved clinical outcomes and an increased likelihood of patients to return for subsequent healthcare services (Lugo, 1997). The provision of on site, employer sponsored nurse practitioner healthcare services which are perceived as acceptable and satisfactory to employees and families affords significant opportunity to both employee

and employer, including enhanced wellness, facilitated health promotion, and reduced overall organizational healthcare costs.

Problem Statement

Therefore, the purpose of this study was to explore and determine the degree of client satisfaction with utilization of primary healthcare services delivered by a nurse practitioner in the Employee Health Services department of a not for profit hospital in the Southern portion of the United States.

Research Objectives

1. To describe adult patients of healthcare services delivered by a nurse practitioner (NP) at a not for profit hospital in the Southern portion of the United States on the following demographic characteristics:
 - a. Age
 - b. Gender
 - c. Marital status
 - d. Highest educational level completed
 - e. Race
 - f. Type of health insurance coverage
 - g. Yearly net income
 - h. Employment status
 - i. Patient type
 - j. Subjective patient report of degree of illness and /or injury necessitating desire to seek medical attention
 - k. Current health problems necessitating medication administration

- l. Number of prescription medications routinely taken
 - m. Number of times the patient has seen a nurse practitioner (NP) within the past year
 - n. Number of times the patient has seen a physician's assistant (PA) within the past year
 - o. Number of times the patient has seen a physician (Phy) within the past year
 - p. Number of times in past year the patient has seen the nurse practitioner in Employee Health at a not for profit hospital in the Southern portion of the US
 - q. The healthcare provider type with whom the patient has been most satisfied (NP, PA, Phy)
 - r. The patient perception of the provider type providing the best health education (NP, PA, Phy)
- 2. To determine the patient satisfaction with care delivered by a NP at a not for profit hospital in the Southern portion of the US as measured by the Nurse Practitioner Satisfaction Survey.
 - 3. To determine if differences in perceived patient satisfaction as measured by the Nurse Practitioner Satisfaction Survey exist within the following demographic characteristics:
 - a. Gender,
 - b. Race
 - c. Age

- d. Marital status
 - e. Highest educational level completed
 - f. Type of health insurance coverage
 - g. Yearly net income
 - h. Patient type
 - i. Employment status
 - j. Subjective patient report of degree of illness/injury resulting in desire to seek medical attention.
4. To determine if a model exists which explains a significant portion of the variance of patient satisfaction as measured by the Nurse Practitioner Satisfaction Survey from subscales/latent factors and associated variables that emerge statistically following factor analysis of the dataset, and the demographic characteristics of gender, age, income, and highest educational level completed.

Significance of the Study

Benefits of demonstrated satisfactoriness of onsite provision of nurse practitioner healthcare services for both employer and employee include facilitated access to care irrespective of employee health plan coverage, enhanced employee wellness, reduced health benefits costs, increased employee productivity, decreased employee absences due to illness, improved employee morale and job satisfaction, reduced clerical and third party claims administration costs, and reduced travel time to visit off site healthcare providers. The documentation of on site nurse practitioner acceptability serves to significantly exert a positive healthcare and financial impact on both employer and employee. By documenting those specific elements of patient satisfaction with care

delivered by nurse practitioners, overall healthcare participation, compliance, and quality of care can be facilitated

Additionally, the acceptability and expansion of nurse practitioner services to family members of employees extends the promotion of employee wellness beyond the workplace and into the family arena, thus further augmenting provided employment benefits and overall wellness maintenance. Studies able to specifically document the acceptability of the extension of healthcare services to family member of employees serve to significantly impact overall family wellness and illness prevention.

Meeting the healthcare needs of employees requires that employers explore alternative health care access options. By documenting the feasibility and acceptability of on site nurse practitioner delivered health care services by employees, such services can be expanded and marketed to other occupational and workplace settings as potential alternative sites of primary healthcare delivery for workers and their families.

The future viability of the nurse practitioner discipline depends upon the identification and perpetuation of those traits, qualities, and aspects of primary care delivery perceived as beneficial and resulting in enhanced patient satisfaction. Measuring and reporting the specific elements of client satisfaction with healthcare provided by nurse practitioners serves to increase nurse practitioner visibility, utilization, and marketability. Studies documenting the specific aspects of nurse practitioner care that contribute to enhanced patient satisfaction can potentially make a distinct contribution to the nurse practitioner profession. The identification of those traits responsible for increased patient satisfaction can result in practice pattern changes that will further improve the acceptability of nurse practitioners as primary care providers.

The enhanced acceptance, marketability, and utilization of nurse practitioners as primary care providers can additionally exert a significant influence on healthcare in the United States today. Increased utilization of nurse practitioners as primary providers of healthcare can significantly impact a national health care system currently plagued by physician shortages, lack of access, and an aging population.

The concept of patient satisfaction is a multifaceted and complex phenomenon. Although past research has indicated an overall favorable acceptability and general positive level of satisfaction with nurse practitioner provided healthcare services, few studies if any have been implemented with the specific intent of explaining and gaining insight into those explicit complexities of human interaction occurring between a patient and nurse practitioner which contribute to and characterize overall satisfaction with delivered healthcare services. This study attempts to explore and detail more intricately those specific attributes which contribute to and define satisfaction with care occurring at the core level of the patient and nurse practitioner interface.

Chapter 2

Review of Literature

Historical Perspective

The origin of the profession of nursing dates back to 1853 with Florence Nightingale's contribution and involvement with caring for the Crimean War wounded. The specific role of the nurse in the 1800's consisted of duties such as cleaning the hospital, general sanitation, and providing basic hygiene to patients. Nicknamed "Lady of the Lamp," this early nursing pioneer is remembered for her implementation of organizational and administrative expertise which resulted in a 40% reduction in mortality rates among the Crimean War wounded (Nightingale, 1860).

Nightingale founded the first school of nursing in 1860. In her book, *Notes on Nursing: What it is, what it is not* (1860); Nightingale described the knowledge of nursing as having a primary focus on sanitation and hygiene. She addressed topics such as ventilation, temperature, noise, nutrition, bedding, and personal hygiene as instrumental to the nursing role (Nightingale, 1860).

Modern nursing and nursing education have evolved considerably since Nightingale's era. The nursing profession has endured a longstanding effort to gain formal recognition as a professional discipline. Numerous theorists and nursing scholars have contributed to elevate the nursing discipline to recognition as a distinct and separate profession within the healthcare realm. Today's nurse has evolved from Nightingale's role emphasis on hygiene and sanitation to that of the professional clinician, capable of combining technical theoretical knowledge, expert clinical skill, empathy, and compassion for the delivery of competent patient care. Such a contemporary focus

within the healthcare arena represents and embodies the unique and individual expression of the art and science of nursing.

Advanced Practice Nursing

Role Inception in the United States

The profession of nursing has evolved into a specialized academic discipline in which members are prepared for diverse roles in providing varying levels of care for patients. The role of the Advanced Practice Registered Nurses is defined by the Louisiana State Board of Nursing, (2003) as:

nursing by a certified registered nurse anesthetist, certified nurse midwife, clinical nurse specialist or nurse practitioner which is based on knowledge and skills acquired in a basic nursing education program, licensure as a registered nurse and a minimum of a master's degree with a concentration in the respective advanced practice nursing specialty which includes both didactic and clinical components, advanced knowledge in nursing theory, physical and psychosocial assessment, nursing interventions, and management of health care. (RS 37:913, 3a, para.1)

The specific practice of nurses performing specialized duties in the delivery of health care dates back as early as 1303 with the Old English use of the term midwife, meaning with woman (University of Kansas School of Nursing, 2005). Early documentation during the colonial period in United States history indicates the presence of nurse midwives in attendance at deliveries providing health care to women and infants in early America. The formal establishment of the professional discipline of nurse midwifery in this country, however, did not occur until the early 1920's in response to the high

incidence of maternal and infant mortality in the Appalachian Mountains and other remote, underserved areas. During this time period the Maternity Center Association (MCA) was founded in New York City to address the program of poor pregnancy outcomes. In investigating health care models which had demonstrated success and were capable of positively effecting maternal and infant health outcomes, nurse midwives emerged as a distinct prospect. In 1929 Mary Breckinridge brought nurse midwives to this country from England where they had gained and maintained respect as competent health care providers to join public health nurses in providing care to women in remote sections of the United States (American College of Nurse-Midwives, 2005).

The oldest advanced practice nursing role in the United States however, is that of the nurse anesthetist, with that of nurse midwifery being second. Medical advances during the 1800's brought about the discovery of an increased number of therapeutic pharmaceutical products including anesthetic agents. Programs to train registered nurses in the patient management and delivery of anesthesia ensued. The first nurse anesthetist in the United States was Sr. Mary Bernard who graduated from the hospital based training program at St. Vincent's Hospital in Erie, Pennsylvania in 1877. The profession has since continued to successfully evolve into a respected and esteemed profession requiring formal academic preparation at the masters' level (Hamrick, Spross, & Hanson, 1996).

The clinical nurse specialist (CNS) role emerged as an additional advanced practice nursing role in 1949 as an effort to improve the delivery of psychiatric health care quality received by patients. The first formal CNS postgraduate program was established in

1943 in psychiatric nursing. Rutgers University is credited with establishing the first masters level postgraduate program for registered nurses in 1954 (Hamrick et al., 1996).

Sherwood, Brown, Fay, and Wardell (1997) report the first formal program of nurse practitioner education at The University of Colorado in 1965. The program prepared nurse practitioners to identify symptoms and diagnose problems in the rural pediatric population of Colorado. The role of the nurse practitioner has undergone significant evolution and change since 1965. Primary forces motivating the professions' development and advancement include changing health and societal needs.

The origins of the nurse practitioner role in the United States in the mid 1960's can be attributed to both timing and dedicated passion of the early nurse practitioner leaders. The early 1960's was an era of significant social discourse in America. Healthcare for the underserved, minority populations in conjunction with an effort to elevate the entry level practice of nursing to the baccalaureate level and develop graduate academic status for advanced practice provided the theater for the development and advancement of the new nurse practitioner role. The primary initiative of the first nurse practitioners in the United States was to expand their nursing roles and fill a societal need by improving healthcare access to the underserved while still remaining nurses (Resnick et al., 2002).

The American Academy of Nurse Practitioners' (2002) role statement for the nurse practitioner as an advanced practice registered nurse describes nurse practitioners as unique clinicians who assess and manage both medical and nursing problems. The American Academy of Nurse Practitioners (2002) further defines the role to include delivery of primary health care as well as specialty healthcare in both the ambulatory and inpatient settings.

Philosophically, the nurse practitioner's approach to patient care is rooted in the caring traditions that have historically defined the nursing profession. The nurse practitioner field has grown from a total of 58,000 active professionals in 1995 to a projection of more than 118,000 by 2006. This number is expected to approximate the total number of family practice physicians in active clinical practice in 2006 (Cooper, 2001).

National Healthcare Challenges

United States Healthcare Issues and the Impact of the Nurse Practitioner

The political, societal, and economic influences on nurse practitioner role evolution since the 1960's have persisted to include modern day maladies. Increasing health care costs along with increased specialization among physicians has resulted in shortages of general family practice specialists. These factors combined with persistent efforts of the nursing discipline to gain formal recognition as a professional, academic entity has served to foster the perpetuation of nurse practitioners as active participants in the delivery of health care today (Pearson & Peels, 2002).

In 1986 a report by the United States Congress Office of Technology Assessment on Nurse Practitioners, Physician's Assistants, and Certified Nurse Midwives: A Policy Analysis concluded that nurse practitioners can provide healthcare services which both substitutes for and augments services provided by physicians. The report further acknowledges the future impact of the nurse practitioner on quality, accessibility, and costs of healthcare in America. Hayes (1985) views the role of the nurse practitioner as especially amenable to meeting the challenge of provision of primary health care services in a cost effective and resourceful manner.

According to Sherwood et al. (1997) the future of healthcare in America is expected to be colored by decreased reimbursement, primary care physician shortages, and increased numbers of Americans with no health care insurance coverage. Nurse practitioners are in a unique position to address the current and emergent problems of the United States healthcare delivery system.

Nurse Practitioner Role Evaluation

Clinical Outcomes Research

Several studies measuring differences in provision of patient care outcomes have determined that care delivered by physicians and nurse practitioners are equivalent. The Burlington randomized trial of nurse practitioners in 1974 was one of the earliest studies of nurse practitioner clinical outcomes conducted in Canada. This study was one of the first to explore and demonstrate the clinical effectiveness and safety of care delivered by nurse practitioners. Comparing physician care delivery to nurse practitioner care delivery on outcome criteria such as mortality, physical function, and emotional function, overall clinical effectiveness and safety of nurse practitioner delivered care was demonstrated. Recommendations for future study included an examination into identification and delineation of the specific and unique characteristics of care delivered by nurse practitioners (Sackett et al., 1974).

A systematic review of 248 studies involving nurse practitioners demonstrated satisfaction and clinical outcome equal to or greater than that of physicians (Feldman, Ventura, & Crosby, 1987). Based on the outcomes patient satisfaction, health status, cost, and process of care, Horrocks, Anderson, and Salisbury (2002) determined no difference in health status and costs between physicians and nurse practitioners in a

review and analysis of 11 trials and 23 observational studies with a prospective experimental design. Studies included for analysis were those that compared nurse practitioners and physicians in similar clinical settings. Nine of the trials included patient satisfaction as an outcome of the health care provider and client encounter. Of the five studies that reported patient satisfaction as continuous data, statistically significant differences in patient satisfaction were noted between physicians and nurse practitioners, with nurse practitioner satisfaction being higher. Of the two studies reporting patient satisfaction results as dichotomous data, no statistically significant differences between provider types was demonstrated. Further findings included significantly improved patient satisfaction and longer lengths of patient consultations with care delivered by nurse practitioners.

Kinnersley, Anderson, Parry, et al. (2000) examined same day care received from either nurse practitioners or physicians in a general medical practice. The study sample consisted of 1368 patients requesting same day healthcare visits who were randomized to either nurse practitioner or physician provider groups. Primary variables examined included patient satisfaction and symptom resolution two weeks after the visit. Secondary outcomes included data regarding patient perception of care during the consultation, follow up consultation, and patient intention to reschedule appointment with the provider. Patients completed a survey questionnaire immediately after the visit and then again at two weeks after the visit. Findings concluded that when compared to general medical practitioners (physicians), patients of nurse practitioners in same day clinics received longer consultations with no difference in clinical outcomes. Additional

conclusions included more overall satisfaction with care received from nurse practitioners.

In a much-publicized article in the medical and lay literature, Mundinger et al. (2000) found no statistically significant differences in health status, patient satisfaction, or outcome between nurse practitioner and physician delivered healthcare. The study involved 1316 patients who were randomized to either the physician or nurse practitioner provider groups in four community based clinics and one urban medical center clinic. Patient satisfaction was measured via a 15-item survey questionnaire immediately following the visit and again at six months following the visit. The Medical Outcomes Study Short Form 36 was additionally utilized to assess physiologic status during the same two assessment intervals. The authors' hypothesized outcome of equality of care and patient satisfaction delivered by nurse practitioners and physicians was strongly supported by statistical analyses of the data generated from the study. No statistically significant differences in health status or patient satisfaction were demonstrated either immediately following the visit or six months after the visit.

In an article responding to the Mundinger study's findings, Sox (2000) stated that the conclusion of same outcomes between the two provider types warrants questioning of the external validity of the study. His rebuttal cautioned against the generalized interchangeability of physicians and nurse practitioners and questioned whether the six-month duration of the study was a sufficient and accurate indicator of the effectiveness of the health care provider. Sox additionally noted that the sample consisted of 76% females with an average age of 44 years, a finding that additionally caused external validity concerns. Sox did concede that the study was conducted using sound research

methodology that resulted in strong interval validity. The author also accepted the generalization of the study's results to short term patient outcomes and care delivery, but cautioned against generalizing to the long-term primary care medical arena. Lenz, Mundinger, Kane, Hopkins, and Lin (2004) provided results of a two year follow up of the original study's findings, further validating no statistically significant differences in health status, satisfaction, disease pathology, specialist referrals, or emergency room visits between physician and nurse practitioner managed clients.

Reveley (1998) evaluated the feasibility of the nurse practitioner in the triage role in a two-year study of 286 patients randomly assigned to either physician or nurse practitioner clinical management for same day clinical appointments. The study evaluated several aspects of care delivery over a two-year period. Patient satisfaction and perception of care was assessed immediately following the visit via interview techniques. Additionally, 30 patients were selected for follow up interviews regarding perceptions of patient satisfaction as well as opinions of the nurse practitioner's clinical ability over a two-year period. Demonstrated differences as a result of the study included a statistically significant difference between the length of consultation times with patients, with nurse practitioners spending an average of 9.56 minutes and physicians spending 5.96 minutes per patient. Statistically significant differences in patient acuity levels were also demonstrated, with nurse practitioners in the study seeing and treating more acute infectious diseases and respiratory disorders than their physician counterparts. Demonstrated advantages to having a nurse practitioner in clinical practice with physicians were shortened patient waiting times and decreased physician workloads.

Several patients considered the female nurse practitioner in the study easier to talk to than the practice's male physicians.

Myers, Lenci, and Sheldon (1997) concur in a similar study, concluding that nurse practitioners can provide safe medical care for urgent primary care medical problems. High patient satisfaction especially with enhanced communication techniques used by nurse practitioners was noted. Rhee and Dermeyer (1995) similarly concluded overall satisfaction and positive acceptability with nurse practitioners in the emergency department triage setting. Cooper, Lindsay, Kinn and Swann (2002) also concurred in a study in which 199 emergency room patients were randomized to care by either nurse practitioners or physicians. Patients were equally as satisfied with the level of care delivered by either type of health care provider, but expressed more overall satisfaction with nurse practitioner delivered care. Patients additionally found the nurse practitioners easier to talk to and felt they provided more personalized information on wellness and prevention. In a similar study of nurse practitioners in emergency departments, Byrne, Richardson, Brunsdon, and Patel (2000) concluded that patients were at least as satisfied with nurse practitioners as they were with physicians. Patients stated increased satisfaction with health education and discharge instructions provided by nurse practitioners. Strengths of nurse practitioners included communication, information giving, and explanations. Chang et al. (1999) studied responses from 232 subjects presenting for emergency department treatment who were randomized to either the physician or nurse practitioner groups. No significant differences in clinical outcome or patient satisfaction were demonstrated between nurse practitioners and physicians,

concluding the general acceptability of advanced practice nurses in the emergency department setting.

Findings in other health care settings were similar. In a study of outcomes and satisfaction with prostate biopsy procedures, Henderson et al. (2004) found equal diagnostic outcome and test reliability in biopsies performed by nurse practitioners and physicians. Equal levels of satisfaction were found between the two groups of providers. In a comparison study of nurse practitioner and physician management of patients with urinary symptoms, Price and Clark (2004) found lower prescription rates, similar laboratory diagnostic test utilization, and overall high levels of patient satisfaction with nurse practitioners. Hill (1997), in a randomized blind comparative study of 70 patients with rheumatoid arthritis, found overall higher levels of satisfaction with those receiving treatment by nurse practitioners. Patients were randomized to either the nurse practitioner or physician group and seen over a one year period for at least six health care visits. Allen (2001) similarly found that over 97% of ambulatory patients treated by nurse practitioners were satisfied with care received. Likewise, in a study by Taylor (2000) health outcomes and patient satisfaction of patients treated by nurse practitioners and physicians were determined to be equivalent in a managed care environment. The educational, technical and professional aspects of the advanced practice role were noted to influence overall satisfaction. Although few studies have examined the role of the nurse practitioner in the inpatient setting, Pioro et al. (2001) concluded that nurse practitioner patient management compared favorably with physician care in cost and clinical outcome.

In an early study of nurse practitioner effectiveness, Prescott and Driscoll, (1979) summarized 31 studies of nurse practitioner effectiveness and identified the problematic nature of comparing nurse practitioners to physicians. The researchers identified the lack of selection of meaningful comparison criteria and acceptable standards of performance as threats to sound research methodology. The authors additionally recommend the use of random sampling and random assignment in future studies when possible.

Shum et al. (2000) concurred, concluding that nurse practitioner management of minor illnesses was both safe and highly acceptable by patients. Findings demonstrated significantly higher patient satisfaction with services delivered by the nurse practitioner. A study by Stables et al. (2004) of 339 patients prepared for cardiac catheterization procedures by either a nurse practitioner or medical staff officer demonstrated comparable safe clinical outcomes among the groups, with the nurse practitioner group achieving significantly higher patient satisfaction scores. McMullen, Alexander, Bourgeois, and Goodman (2001) similarly found no significant differences in provider knowledge and skill and quality of care received between medical house officers and nurse practitioners in the acute care setting. Patients of nurse practitioners appeared to be more satisfied with the nurse practitioner's communication skill and ability.

In a comparison study of physicians or physician-nurse practitioner teams, the nurse practitioner-physician collaborative team approach resulted in improved diabetes management and cholesterol levels among patients. Significant differences were noted in time spent with the patient; the collaborative team spent an average of 180 minutes with patients, while physicians alone spent approximately 85 minutes in direct patient interaction. Significantly higher satisfaction was noted among the patients cared for by

the physician-nurse practitioner teams, probably as a result of the increased time spent during visits. Harwood, Wilson, Heidenheim, and Lindsay (2004) similarly found the nurse practitioner-nephrologist care model resulted in an overall improvement in care. Factors noted to influence the improved satisfaction included quality time spent with patients, enhanced continuity of care, and improved multidisciplinary team communication.

Patient Satisfaction and Acceptance

Patient satisfaction with care received is an essential criterion by which patients assess quality of medical care received. Satisfaction is broadly defined as the human experience of being filled and enriched by an experience (Merriam Webster Online Dictionary, 2005). Additionally, Williams (1994) defines patient satisfaction as the client's personal and subjective evaluation of expectation fulfillment.

According to Merkouris, Infantopoulos, Lanara, and Lemonidou (1999), the first study of patient satisfaction in nursing occurred in 1956. Assessment of patient satisfaction is viewed by the authors as vital and necessary in modern health care due to rising costs and the need for resourcefulness and efficiency in processes of health care delivery. Patient satisfaction is viewed as a significant and valid measure of efficiency in health care delivery. Patients are often active and discerning consumers capable of rendering opinions regarding care received. Positive satisfaction with health care is further viewed as a determinant of patient compliance and subsequent health status outcome. For the provider satisfaction with health care is viewed as instrumental to attracting and maintaining patients within the competitive health care arena. Additionally, within the health care professions there exists an explicit need to measure

and recognize the work and efforts of nurses. Data generated from patient satisfaction surveys can provide a scientific basis, much more compelling than mere tradition, upon which to effect positive changes within the profession. To accomplish this goal, the authors emphasize the need for increased emphasis on the psychometric development of instruments developed to measure satisfaction with nursing care.

In her analysis of the concept of patient satisfaction as it related to contemporary nursing care, Mahon (1996) stresses that nursing scientists at the doctoral level have a responsibility to explore and further define concepts in which the profession of nursing demonstrates an interest. Patient satisfaction levels are used by a number of health care credentialing bodies as a measure of health outcome. Other than morbidity and mortality measurements, patient satisfaction is the most frequently measured health care outcome. Patient satisfaction determinants frequently include individual expectations, subjectivity, and perceptions. Amid multiple theoretical definitions that have been proposed to operationalize the concept, a lack of consensus regarding the concept's specific defining elements currently exists.

Renzi et al. (2001) correlated poor patient satisfaction with poor adherence to prescribed medical regimes and consequently poor health outcomes in a study of dermatological outpatients. Through the analytical techniques of factor analysis and multiple regression, client age of 60 years or more and visits lasting 10 minutes or more were the only factors that were significantly associated with overall satisfaction. They conclude that a health care provider's ability to provide clear explanations and to display empathy and concern contributes positively to enhanced patient satisfaction. Furthermore, improving health care practitioners' interpersonal skills can effect patient

satisfaction more positively. Additional findings of the study included higher documented satisfaction by men, those with higher education, higher severity of disease, and enhanced quality of life.

In a descriptive study of patient satisfaction with advanced practice nurses, Bryant and Graham (2002) found that affective support, health information received, decisional control, and technical competence all positively influenced client satisfaction with care. In a meta analysis of nurse practitioners and nurse midwives in primary care, Brown and Grimes (1995) determined that the level of patient satisfaction with advanced practiced nurse delivered health services was significantly and statistically higher than that of physicians. Branson, Badger, and Dobbs (2003) concur, relating positive satisfaction in 52 studies reviewed. Often, age, health status, and socioeconomic status were the most important determinants of patient satisfaction. In a qualitative study comparing patient expectations of a nurse practitioner visit and degree to which those expectations were met, Donohue (2003) found several positive qualities of the nurse practitioner interaction. Among these were the provision of specific health information and adequate length of time of the nurse practitioner patient visit.

Health status of patients has also been determined to influence client's satisfaction with care. Powers and Bendall-Lyon (2003) determined that more highly satisfied patients tended to view their health status more positively. These individuals were also more likely to return for follow up appointments. Multiple factors and aspects of care within the health care arena ultimately determine an individual client's opinion regarding satisfaction with services rendered. Of these factors interpersonal communication is

often the most important determinant of satisfaction, demonstrating the importance of patient education, communication, and feedback in the delivery of health care.

The amount of time required by patients to wait before seeing a health care provider was found to be inversely correlated with overall satisfaction. In a study involving subjects who were randomly assigned to groups either receiving or not receiving health education in the waiting room, Oermann, Masserang, Maxey, and Lange (2002) found that patient education delivered in the waiting room had no effect on overall satisfaction, but did result in increased satisfaction regarding health education received. Cole, Mackey, and Lindenberg (2001) conversely found no statistically significant relationships between wait times and patient satisfaction in a nurse practitioner clinic.

Satisfaction has also been demonstrated to vary and be affected by type of health insurance plan. Dellana and Glacoff (2001) concluded differences among health care consumers' satisfaction levels on the constructs of access to care, availability of resources, and financial aspects of care according to type of health insurance plan. Zoller, Lackland, and Silverstein (2001) demonstrated through multiple regression analysis that waiting time and understanding of explanations provided by health care providers were the only items which were determined to be statistically significant predictors of patients' intent to return for follow up clinic visits. Patient satisfaction was additionally found to be influenced by the amount of time spent with the health care provider. Higher satisfaction with longer visits was demonstrated by Gross, Zyzanski, Borawski, Cebul, and Strange (1998). Satisfaction was also demonstrated to increase by chatting briefly about non-medical topics and allowing time for questions. Beach et al. (2004) stipulate that satisfaction varies by health care specialty. Self-disclosure by

primary care physicians was demonstrated to have a negative effect on patient satisfaction, while self-disclosure by surgeons resulted in increased satisfaction.

Knudtson (2000) examined the level of patient satisfaction with nurse practitioner services in a rural type clinical setting in an effort to examine relationships between patient satisfaction, patient demographic characteristics, expectations of services, and the likelihood of patients to recommend nurse practitioner services to others. Significantly high levels of patient satisfaction with care delivered by nurse practitioners were demonstrated. In particular, clients were satisfied with the interpersonal aspects of nurse practitioner provided care. Other statistically significant indicators of patient satisfaction included younger age and higher educational levels of patients. In a separate study of nurse practitioner acceptance in the rural setting, Baldwin et al. (2001) concluded that patients exhibited favorable acceptance of nurse practitioners and physician assistants when they worked in collaboration with physicians, functioned as coordinators of care, and made an effort to integrate into the community.

Safran et al. (1998) examined the relationship between primary care performance and clinical care outcomes of physicians. The study examined the relationships between clinical care accessibility, continuity, comprehensiveness, integration, clinical interaction, interpersonal treatment, trust with outcomes such as adherence to physician's advice, patient satisfaction, and improved health status. Results demonstrated that trust was the variable most strongly associated with patient satisfaction. Additional positively correlated variables to patient satisfaction included communication and personal knowledge of the patient. Campbell, Mauksch, Neirkirk, and Hosokawa (1990) evaluated provider styles in delivering health care and found little difference between

nurse practitioner and physician interactional style. Nurse practitioners were found to emphasize psychosocial issues more than physicians. Phillips, Palmer, Wettig, and Fenwick (2000) through multiple regression analysis demonstrated that higher education, higher income, and younger age were significant predictors of patient satisfaction. Green (2002) conversely determined that patients aged 18 – 25 years were less satisfied with nurse practitioner delivered healthcare. Similarly, Pinkerton (1998) found no statistically differences in health outcome or patient satisfaction between nurse practitioner and physician managed groups. Clients were determined to be more satisfied with nurse practitioner interpersonal manner, time spent in collaboration, accessibility, and convenience. Likewise, Wilson (1999) found no statistically significant differences in satisfaction based on client gender, age, employment status, educational level, and marital or family status.

In a retrospective observational study over a four-year time period, Roblin, Becker, Adams, Howard, and Roberts, (2004) reviewed over 41,209 responses from patients regarding level of satisfaction with care received. The researchers measured satisfaction at three levels; practitioner interaction, care access, and overall experience and concluded that patients in an outpatient health maintenance organization were significantly more satisfied with practitioner interaction during care delivery by physician assistants and nurse practitioners than by physicians. Patients reported higher satisfaction with interactions by nurse practitioners and physician assistants than by interactions with physicians. Satisfaction with care access and overall experience did not differ significantly by type of practitioner in the study. For all practitioner types on all three scales, increased satisfaction was associated with visits by older males, hypertensives,

and asthmatics. In the study a significant proportion of the variance in patient satisfaction was determined to be related to time spent with the practitioner and the accommodation of requests for visits with specific practitioners rather than type of practitioner actually present at the health care visit. Hooker, Potts, and Ray (1997) also found no difference by provider type, age, gender, and length of employment in a Kaiser Permanente study of physician assistants, nurse practitioners, and physicians, concluding that patient satisfaction depended on communication style and not on provider. Greeneich (1995) found that 35% of the variance in patient satisfaction could be attributed to nurse practitioner practice and personality characteristics. Differences in patient satisfaction were also to vary by the number of health care visits experienced by patients.

In a study of seven nurse practitioner who managed clinics at four different academic settings, Benkert, Barkauskas, Pohl, Tanner, and Nagelkirk (2002) through factor analysis of a patient satisfaction survey found three underlying constructs. These included clinic care, phone contact, and willingness to return or recommend the clinic to others. Statistically significant differences in scores were noted in varying age and gender groups. Younger patients were appeared to be more satisfied with treatment received over the phone, while men rated overall satisfaction lower than women.

Patient Satisfaction Measurement and Instrumentation

Williams, Coyle, and Healy (1998) concluded that while patient satisfaction surveys frequently measure the positive or negative experiences of health care consumers, they are incapable of transforming individual perceptions of an experience into a specific evaluation of actual services delivered. In a study of the British National Health

Service's Consumer Satisfaction Questionnaire (CSQ 18B), an instrument used to measure mental health services, the authors conclude the no single measurement tool is capable of eliciting patient responses to all aspects of care received. They conclude a lack of consensus in determining the specific mechanisms responsible for positive patient satisfaction. Several items on the CSQ 18B that were determined to be indicators of positive patient satisfaction were determined to actually contain a number of hidden negative patient incidents. The concept of satisfaction is viewed as very difficult to define and consequently very difficult to measure. Concluding that satisfaction results from the fulfillment of patient expectations, the authors emphasize that satisfaction instruments must evaluate a patient's experiences of services as well as the associated personal value and meaning ascribed by each individual. The authors further conclude that no single instrument is capable of eliciting patient opinion in all service areas and recommend survey development specific to each health care delivery area.

Mulchahy and Tritter (1998) explain the relationship between satisfaction, dissatisfaction, and the act of complaining. Purporting that commonly utilized data collection techniques often affect patient responses, the authors additionally stress the vital nature of instrument development. In their research, the authors found that subjects were more likely to express satisfaction than dissatisfaction; and that closed ended questions often elicit positive responses, while open-ended questions frequently provide negative evaluations. They conclude that a multidimensional assessment of care is necessary in evaluating the complex construct of patient satisfaction.

In a comparative study of seven types of patient satisfaction assessment, Ross, Steward, and Sinacore (1995) found no data collection method superior to others studied,

and noted the extreme variability in satisfaction related to different measurement methods. Williams (1994) concurred stressing the importance of developing assessment techniques and methods that were capable of measuring the individual perceptions and evaluations of clients. Kinnersley, Stott, Peters, Harvey, and Hackett (1996) found no significant differences in satisfaction levels between the Medical Interview Satisfaction Scale (MISS) and the Consultation Satisfaction Questionnaire (CSQ). Subjects who completed the survey at home instead of prior to leaving the health care visit, however, noted lower levels of satisfaction. The authors concluded that no single scale is clearly superior in measuring the complex concept of patient satisfaction. In a qualitative descriptive study of patient satisfaction with nursing care, Larrabee and Bolden, (2001) found that five aspects of care were responsible for the perception of nursing care quality by patients. These included providing for needs, treating pleasantly, caring, being competent, and providing prompt care

In an attempt to develop an instrument capable of assessing patient satisfaction in an outpatient physician practice, DiTomaso and Willard (1991) identified several factors that contributed to overall patient satisfaction. These included satisfaction with physician, dissatisfaction with practice management, physician availability, receptionist behavior, and wait time. In developing a survey to measure community acceptance of nurse practitioners and physician assistants, Baer et al. (1999) discovered that the dimensions of knowledge, access, competence, and trust contributed to overall satisfaction and acceptance of midlevel health care providers.

Alexander (2001) describes construction of an instrument aimed at measuring patient perceptions of nurse practitioner qualities and competencies. Factor analysis of the data

revealed the existence of a single factor accounting for 45.6% of the variance, suggesting the representation by the data of a single construct. Turner and Pol, (1995) suggest that instrumentation challenges are the result of extreme difficulty in quantifying and measuring patient perceptions, beliefs, and expectations. They recommend more qualitative research involving patient input in the development of patient satisfaction surveys. Cole, Mackey, and Lindenberg (1999) evaluated the psychometric properties of the Nurse Practitioner Care Instrument and concluded the extraction of three factors underlying the concept of patient satisfaction including effectiveness and ineffectiveness, comprehensiveness of care, and caring behaviors.

Oermann (1999) investigated quality health care evaluations by patients and identified specific descriptors of positive experiences. These included access to care as the most important, but also included health care provider competency and appropriateness in medical treatment. Bear and Bowers (1998) demonstrated through the use of a nursing framework to measure satisfaction overall satisfaction with care with the Client Satisfaction Tool (CST). Satisfaction was best explained by the client's perception that the nurse practitioner demonstrated competency and knowledge and provided education regarding home care. Results validated that the nurse practitioner model of care is one that elicits client satisfaction.

Courtney and Rice (1997) found high patient satisfaction with nurse practitioner communication style and degree of client participation. Acknowledging the multifaceted nature of communication style and patient satisfaction, the authors recommended continued development and refinement of instruments to assess specific nurse practitioner actions related to increased patient satisfaction.

In a study measuring patient satisfaction outcomes across provider disciplines, Marsh (1999) concluded the existence of a single construct through factor analysis of data gathered by the Patient Satisfaction with Health Care Provider Scale. The scale was developed incorporating the satisfaction constructs of access, humaneness, quality, and general satisfaction and administered to 167 adults of either nurse practitioner or physician care in a managed care setting. Data analysis revealed the existence of a single construct with no significantly significant differences in patient satisfaction by age, gender, ethnicity, or provider type.

Although many studies have demonstrated satisfactory patient satisfaction with nurse practitioners in a variety of clinical settings, few if any have investigated patient satisfaction with nurse practitioners in the occupational health arena. Data regarding those specific elements of primary health care delivery by nurse practitioners demonstrated to impact patient satisfaction in the employee health setting is severely lacking in the literature and the primary purpose of this study.

Chapter 3

Methodology

Population and Sample

The target population for this study was defined as all employees and family members of employees over the age of 18 having onsite occupational access to nurse practitioner primary healthcare services. The accessible population consisted of all fulltime, part time, prn (as needed), and contract employees and family members of a not for profit hospital in the Southern portion of the United States who voluntarily presented themselves for nurse practitioner delivered healthcare services beginning on January 3, 2005. A sample of 300 clients from this representative population was selected for participation in the study. The 300 subjects were comprised of adult clients over the age of 18 years presenting for healthcare visits at the study clinic during the period that extended from January 3, 2005 through February 17, 2005.

Approval for implementation of the study was obtained from the Louisiana State University Institutional Review Board for Human Subject Protection prior to initiation. The study was granted approval #2769 (Appendix A).

Subjects were asked to complete the survey following completion of their visit with the nurse practitioner. At the completion of the visit, the purpose of the study was explained to each subject by the nurse practitioner. Subjects were then handed a pen and a clipboard containing an informational consent form (Appendix B) and a copy of the survey. Each subject received a brief verbal overview of the research project and was instructed on proper survey completion techniques. Subjects were allowed to remain alone in the examination room for purposes of privacy and anonymity in survey

completion. Upon completion of the instrument, subjects exited the examination room and anonymously placed the surveys into one of two receptacles located either near the patient exit area or in the waiting room. Subjects completed the survey only once, and upon follow up or return visit during the study period were not provided with the opportunity to complete in multiple. Based on analysis and examination of patient volume statistics maintained in the study clinic since 2001, the sample selected was determined to represent a “slice in time” or partial census, and therefore determined to be a representative group from the population.

To determine how many subjects to include in the study, a minimum sample size was estimated. Sample size was determined using Cochran’s (1977) formula. Cochran’s formula allows determination of an appropriate sample size indicative and representative of the population. Cochran’s formula is stated as:

$$\underline{n} = \frac{(\underline{t})^2(\underline{s})^2}{(\underline{d})^2}$$

where, \underline{n} = target sample size, \underline{t} = critical value from the t distribution, \underline{s} = estimate of the variance of the scaled items, and \underline{d} = acceptable margin of error for the mean being estimated.

$$\frac{(1.96)^2(5/4)^2}{5(.03)^2} = \frac{(1.96)^2(1.25)^2}{(0.15)^2} = \frac{(3.8416)(1.5625)}{0.0225} = \frac{6.0025}{0.0225} = 266.78 = 267$$

An estimate of the variance of the scaled items, \underline{s} was calculated and incorporated into the formula. Given that 98% of the responses are captured by a total of 4 standard deviations from the mean, the following calculation was performed: $\underline{s} = 5$ (total points on the scale) / 4(SD’s capturing 98% of responses) = 1.25. Also \underline{d} , the acceptable margin of error for the mean being estimated was determined by multiplying the study’s acceptable margin of error, .03 by the number of points on the scale, 5 for a \underline{d} value = .15. In

applying the formula an alpha level or probability of Type 1 error of .05 and the associated t value of 1.96 was utilized (Bartlett, Kotrlik, & Higgins, 2001).

Instrumentation

An exhaustive review of the literature indicated that no existing instrument entirely and satisfactorily demonstrated promise or pertinence to the specific objectives of this study. Therefore, a new instrument, the Nurse Practitioner Satisfaction Survey (NPSS), a 5 point Likert-type survey was created specifically for the purposes of this study from a compilation of numerous satisfaction scales reviewed, a review of related literature, and professional opinion (Appendix C).

The NPSS is composed of 28 Likert-type items compiled with the intent of including the specific concepts viewed as instrumental to the development of overall client satisfaction with care. Specific dimensions hypothesized to theoretically serve as determinants and underlying constructs of the overall concept of patient satisfaction with nurse practitioner delivered healthcare included convenience and accessibility; competence, knowledge, and trust; receptivity, openness, and interpersonal communication; and general satisfaction. The survey additionally included items related to patient demographics, current and previous health status, past interactions with healthcare providers, and general opinion of healthcare and education received in the past.

As the Nurse Practitioner Satisfaction Survey is a newly developed research tool, a factor analysis was initially performed on the data generated from the study. Factor analysis is a research strategy used to categorize or group variables represented by individual survey items into broader underlying latent sub groupings or factors measured

by the instrument. Individual survey items are sorted into sub groupings based on their interrelationships and correlations with each other. Each broader sub grouping of the original set of variables is then determined to represent or define an underlying latent construct within the structure of the broader concept investigated (Kim & Mueller, 1978).

Factor analysis consists of two primary methods of investigation, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The two methods differ in their approaches to the data. EFA attempts to determine the number and nature of the underlying factors influencing the data, while CFA tests whether a pre specified factor set is influencing the data in a predictive fashion. EFA seeks insight through new knowledge and understanding, while CFA seeks insight through model testing (DeCoster, 2000).

As the instrument used in this study was newly developed specifically for purposes of the study, EFA was determined to be an appropriate means of discerning the basic nature and structure of the individual items represented by the survey.

The number of underlying factors was determined jointly by the Kaiser criteria and by visual examination of the Cattell scree plot. Kaiser criteria dictates that eigenvalues exceeding 1.0 be retained in the analysis while those below 1.0 are dropped from further analysis. A secondary factor determination method, the Cattell scree test creates a plot with individual eigenvalues on the y-axis and the factors on the x-axis. Examination of the plot is performed to determine where the curve flattens, making a less steep decline. All eigenvalues beyond that point are then dropped (Hayden, Allen, & Scarpello, 2004).

Principal axis factoring as a common factor extraction technique was employed in the factor analysis of the dataset; as such a technique appeared to be applicable to the specific objectives of the study. As a method of factor extraction common factor

analytical techniques examine only shared or common variance existing between individual items analyzed. Principal axis factoring is a common factor extraction technique that examines intercorrelations and common variance among the 28 interval level survey variables on the NPSS. This technique attempted to identify an underlying structure of the latent factors contributing to the common variance and defining the overall concept of patient satisfaction measured by the NPSS (Conway & Huffcutt, 2003).

Common factor methods differentiate between common and unique (specific and error) sources of variance within a model and subsequently utilize only the common or shared variance in establishing correlations and determining factors. Principal components models as a factor extraction technique conversely make no such differentiation between common and unique variance in determining factors. Such models include analysis of both common and unique sources of variance in extracting latent constructs (Conway & Huffcutt, 2003).

A primary purpose of this research study was to gain an understanding of the latent structure underlying patient satisfaction as represented by the measured variables. Therefore principal axis factoring as a common factor extraction technique was most appropriately employed as a means of accomplishing this objective.

The instrument developed for this study included 28 interval level variables that were analyzed in an attempt to discern a possible underlying matrix of factors representing and defining the complex concept of patient satisfaction. As the broad concept of patient satisfaction deals with an individual's unique perceptions, feelings, and opinions, a certain degree of interrelationship between identified factors was certain to exist. A

promax, oblique rotation of the factors appeared most appropriate for this study as such a technique calculates factor loadings by assuming that the factors are correlated or related. Orthogonal rotations conversely assume no correlation among factors (Fabringer, MacCallum, Wegener, & Strahan, 1999).

Additionally, the tool was piloted prior to implementation in a similar clinical setting with a similar accessible population with a nurse practitioner comparable in scope of practice, number of year's experience, and patient population served. As a result of the pilot study, minor editorial modifications were made to the instrument to assure clarity and editorial appropriateness. The tool was additionally reviewed by a panel of doctoral prepared nurse practitioners and/or nursing faculty members for completeness and relevancy of content. A total of 39 pilot study surveys were returned during the pilot period. Based on the recommended minimum ratio of five subjects per interval level survey variable, this sample size was determined to be inadequate for meaningful interpretation of factor analysis computation (Crocker & Algina, 1986).

Data Summary and Analysis

Data collected in this study were statistically analyzed as described for each objective below.

Objective 1

Objective 1 is descriptive in nature and was analyzed using descriptive statistical techniques. The variables gender, race, marital status, type of health insurance coverage, patient type, employment status, healthcare provider type with whom the patient has been most satisfied, and of nurse practitioners, physicians, and physician's assistants, the patient's perception of the provider type providing the best health education are nominal

variables that were summarized using mode, frequency, and percentages in each category.

The variables number of prescription medications currently taking, and number of current health problems necessitating medication administration are interval variables that were examined and summarized through calculation of means and standard deviations.

The variables age, yearly net income, subjective patient report of degree of illness and injury necessitating the patient's desire to seek medical attention, highest educational level completed, number of times in past year the patient has seen the nurse practitioner at The Study Hospital, and number of times in past year the patient has seen a physician, a physician's assistant, and a nurse practitioner are ordinal in nature and were described using calculations of frequencies and percentages in each category.

Objective 2

Objective 2 is descriptive in nature and was analyzed through summation and calculation of means and standard deviations of the 18 items from the Nurse Practitioner Satisfaction Survey determined to be emergent indicators of the construct general satisfaction derived from analysis of the three factor model solution. For the 28 interval level variables, subjects were asked to indicate their degree of agreement or disagreement with a statement regarding nurse practitioner care by shading in hollow circles to indicate "Strongly Disagree," "Disagree," "Agree," "Strongly Agree" or "Undecided." Responses were then coded as follows: "Strongly Disagree = 1," "Disagree = 2," "Undecided = 3," "Agree = 4" and "Strongly Agree = 5." Individual overall satisfaction scores were computed for each of the 300 study subjects by summing scores on each of

the 18 items from the Nurse Practitioner Satisfaction Survey determined to be emergent indicators of the construct “general satisfaction” following exploratory factor analysis of the 28 interval level variables comprising the dataset.

Exploratory factor analysis of the 28 interval level items from the Nurse Practitioner Satisfaction Survey was initially performed using a principal axis factoring extraction technique and a promax (oblique) rotation. Factor solution models consisting of two through six factors derived from oblique rotations were calculated and compared, with the three factor model derived from principal axis factoring with a promax rotation determined to be the best solution.

Principal axis factoring was employed as it, as a factor extraction technique, differentiates between common and unique (specific and error) variance of factors, and subsequently utilizes only common or shared variance in establishing correlations and determining factors. Principal axis factoring facilitates factor solution interpretations without modifying the underlying relationships between individual factors or variables. Promax as a type of oblique factor rotation technique allows for the establishment of relationships between the factors and attempts to fit the data to a targeted simple structure model when rotating to a final solution (Conway & Huffcutt, 2003, Crocker & Algina, 1986).

Promax achieves fast and simple factor rotations by attempting to create a target data matrix with simple structure. Simple structure is the pattern of results where each variable loads highly onto one factor. Promax achieves this by initially using a varimax rotation and then raising factor loadings to a power between 2 and 4. This maneuver artificially creates a forced bipolar structure of the factor loadings for each construct.

Promax then computes a least square fit of the varimax solution to the targeted matrix with simple structure to achieve the optimal final rotated solution (Abdi, 2003). The concept of patient satisfaction is complex, multifactorial, and dependent upon individual subjective patient accounts and opinions. Constructs underlying its composition were therefore determined to undoubtedly exhibit considerable interrelationships. Principal axis factoring and promax rotation allow for the existence of correlations between variables based on shared or common variance, and additionally allow for the existence of relationships between factors extracted during rotation to a final solution.

Since items 1, 2, 3, 4, 5, 12, and 13 specifically reference and include the term “satisfaction”, an a priori hypothesis regarding the inclusion of these specific items in each subject’s patient satisfaction score was therefore postulated. This hypothesis was subsequently accepted, as these hypothesized variables were determined to be included in the 18 variables that loaded highly on the factor “general satisfaction.”

Objective 3

Objective 3 is comparison in nature and was accomplished through analysis of Independent t-tests, Oneway Analysis of Variance (ANOVA) calculations, and the Welch statistic that was employed to address comparisons between groups violating the assumption of homogeneity of variance. The Independent t-test compares the means of two independent levels of a given variable in order to determine if the calculated mean differences exhibit statistical significance.

The Oneway Analysis of Variance (ANOVA) performs a similar comparison of means but is capable of comparing means of two or more levels of a given variable through calculation of the F statistic. Comparisons employing ANOVA first undergo

analysis and calculation of Levene's Test of Homogeneity of Variance to determine if the group variances are equal. Levene's statistic tests the null hypothesis that the variance between all compared groups is equal. When testing at the .05 level of significance, homogeneity of variance is demonstrated if the significance of the Levene's statistic is greater than .05, resulting in a failure to reject the null hypothesis of equal variances.

The Welch test is recommended as an alternative to ANOVA when results of Levene's statistic demonstrate a violation of the assumption of homogeneity of variance and groups are of unequal sizes. Employed under conditions of heteroscedasticity, lower degrees of freedom are used in calculating the Welch statistic (Milliken & Johnson, 1984). The Welch test was utilized in this study when violations of the assumption of homogeneity of variance precluded utilization of the Oneway ANOVA computation.

When group differences are determined through ANOVA calculation of a statistically significant F value, post hoc tests are then employed to determine the location of the significant differences between group means. The Scheffe' multiple comparison procedure was utilized in this analysis as it compares individual combinations of group means by computing an F value for each pair evaluated. The Scheffe' method was most appropriately utilized in this study as it is capable of comparing means of unequal group sizes (Hinkle, Wiersma, & Jurs, 2002).

The interval level variable patient satisfaction was determined through calculation of the sum of responses to those items determined to be emergent indicators of the construct general satisfaction as determined by factor analysis of the dataset. Patient satisfaction scores were subsequently compared as described above among the groups or levels within the following demographic variables:

- a. Gender
- b. Race
- c. Age
- d. Marital status
- e. Highest educational level completed
- f. Type of health insurance coverage
- g. Yearly net income
- h. Patient type
- i. Employment status
- j. Subjective patient report of degree of illness and/or injury resulting in desire to seek medical attention.

Objective 4

Objective 4 was accomplished through multiple regression analysis with the sum of the items emerging as indicators of the latent constructs “general satisfaction,” “communication,” and “scheduling” from the Nurse Practitioner Satisfaction Survey calculated to represent the dependent variables for three multiple regression equations. Independent variables entered into the equation included the demographic variables of age, gender, income, and highest educational level.

Multiple regression is a statistical maneuver that involves predicting criterion values, patient satisfaction scores, from an examination of the relationships between the various predictor values (Hinkle et al., 2002). Subscales representing latent factors and associated variables that emerged statistically following factor analysis of the dataset were utilized as dependent variables for the computation of three separate multiple

regression equations. Each level of the demographic variables of gender, age, income, and highest educational level completed were recoded to dummy variables prior to analysis.

Dummy coding refers to the process of assigning different numbers or codes to the various levels of categorical data. Assigned symbols or codes represent mutually exclusive subsets of the variables and indicate group membership. The coded numbers do not represent quantities or rank, merely group membership or exclusion within the levels of the variable that allow for facilitated analysis such as multiple regression (Pedhazur, 1997).

Pearson's Product Moment Correlations were then calculated to determine the relationships between each dummy variable and the satisfaction subscore representing the dependent variable for each of the three equations. Pearson's Product Moment Correlation is the most commonly used in the behavioral sciences and measures the strength and direction of the relationship between two variables (Hinkle et al., 2002). Calculated bivariate correlations were analyzed according to Davis's (1971) descriptors of association (.00-.09 = negligible, .10-.29 = low, .30-.49 = moderate, .50-.69 = substantial, .70 and higher = very strong). Those dummy variables with the lowest correlations with the dependent variable for each of the four independent variables in each equation were deleted from analysis.

Dummy variables representing the remaining levels of the independent variables gender, age, income, and highest educational level completed were then entered stepwise into the multiple regression equation as a block because of the exploratory nature of the study. For the stepwise computations the probability of F to enter the equation was set at

.05, and the probability of F to be removed from the model was set at .10. Equation variables that increased the explained variance by one percent or more were added to the multiple regression equations as long as the overall regression equations remained significant.

Prior to analysis variables were examined for normality, homoscedasticity, and the presence of outliers and influential data points. Outlier detection was accomplished through examination of calculated standardized residuals. Residual values exceeding the value of ± 2.0 were scrutinized with a subsequent decision to delete or allow the subject to remain in the dataset. Standardized residuals were also plotted against the dependent variables to observe for patterns and randomness in distribution around zero, providing an assessment of the assumption of homoscedasticity (Pedhazur, 1997).

Influence analysis was subsequently performed through analysis of Cook's D and the leverage statistic (h). Influential data points are cases that exert influence on the estimated regression line and are functions of the independent variables. Leverage (h) values were examined and compared to a calculated maximum parameter. Values exceeding that of the parameter were scrutinized as potential influential data points. Cook's D is an additional method of detecting influence analysis. All calculated Cook's D values in excess of the maximum parameter of 1.0 are further scrutinized as potentially exerting exceptional influence on the regression estimates. Cook's D values are affected by independent and dependent variables (Pedhazur, 1997).

Cases were also examined for potential changes in regression coefficients determined to possibly exist in the absence or following deletion of an individual case or subject. DFBETA values were calculated and examined for all cases in the analysis in order to

determine potential effects in the absence of particular cases. DFBETA values indicate the degree of anticipated change in regression estimates upon deletion of cases (Pedhazur, 1997).

Collinearity diagnostics were employed to assist in identifying the degree of redundancy or overlap among independent variables in order to minimize predictor or coefficient duplication in the computation of the three multiple regression equations. Collinearity diagnostics allow for the identification of redundancies among variables, thus avoiding the detrimental effects of correlated or interrelated independent variables on the overall regression equation. Such measures employed in this study to enhance and maximize the overall predictive ability of the multiple regression equations included the examination of partial correlation values, variance inflation factors (VIF) and tolerance levels (TOL) (Pedhazur, 1997).

Partial correlation values identify the unique relationship of an independent variable with the dependent variable after controlling for all other independent variables in an equation. A goal of stepwise regression techniques is to parsimoniously determine the subset of the smallest number of independent variables that explain the maximum amount of variance in the dependent variable, or to choose the least number of independent variables capable of maximizing overall prediction. With stepwise regression variables can be entered and then removed from the equation depending on the degree of variance (R^2) explained by subsequent calculations (Pedhazur, 1997).

In stepwise regression the independent variables with the highest partial correlations with the dependent variable are added to the intercept to formulate the regression equation. Partial correlations examine the relationship between a single independent

variable and the dependent variable while removing the effects of the other independent variables. In stepwise regression those independent variables exhibiting the highest partial correlations with the dependent variable and significantly explaining overall model variance are added in steps to the equation. Once added a variable may also be removed depending on the recalculation of its overall contribution and ability to explain variance in the equation's dependent variable (Pedhazur, 1997).

Variance inflation factor values (VIF) represent the escalation in variances that exist due to collinearities and interrelationships among the variables. Variance inflation factor values represent the degree of redundancy or overlap between independent variables and additionally consider the amount of calculated standard error associated with the variable. High variances result in high standard errors and consequently high variance inflation factors (VIF). High VIF values indicate high intercorrelations among the variables, and levels greater than 10 indicate serious problems with the data (Pedhazur, 1997).

Tolerance levels (TOL) are computed as $1/VIF = TOL$. Smaller tolerance levels (TOL), especially levels greater than .01 indicate high collinearity (Pedhazur, 1997). Tolerance levels combined with variance inflation levels provide an effective mechanism for determining the existence of interrelationships among variables (Pedhazur, 1997).

Chapter 4

Results and Discussion

The primary purpose of the study was to explore and determine the degree of client satisfaction with utilization of primary healthcare services delivered by a nurse practitioner in a hospital occupational setting. A total of 300 subjects over the age of 18 years were surveyed following completion of a health care visit in the study clinic. Findings and analysis of the patient satisfaction survey data are presented in this chapter. Results are arranged and presented by research objective and include objectives one through four.

Objective One

Objective one of the study was to describe adult patients of healthcare services delivered by a nurse practitioner (NP) at a not for profit hospital in the Southern portion of the United States on the following demographic characteristics:

- a. Age
- b. Gender
- c. Marital status
- d. Highest educational level completed
- e. Race
- f. Type of health insurance coverage
- g. Yearly net income
- h. Employment status
- i. Patient type

- j. Subjective patient report of degree of illness and /or injury necessitating desire to seek medical attention
- k. Current health problems necessitating medication administration
- l. Number of prescription medications routinely taken
- m. Number of times the patient has seen a nurse practitioner (NP) within the past year
- n. Number of times the patient has seen a physician's assistant (PA) within the past year
- o. Number of times the patient has seen a physician (Phy) within the past year
- p. Number of times in past year the patient has seen the nurse practitioner in Employee Health at a not for profit hospital in the Southern portion of the US
- q. The healthcare provider type with whom the patient has been most satisfied (NP, PA, Phy)
- r. The patient perception of the provider type providing the best health education (NP, PA, Phy)

Age

The sample was initially described on the variable "Age." Respondents were asked to choose from the most appropriate category "18-25," "26-35," "36-45," "46-55," "56-65," "66-75," "76-85," and "86 and older." The largest number of respondents indicated their age as between 26 and 35 years ($n = 87, 31.0\%$). The second largest group was the 36-45 age group, with 74 (26.3%) of the respondents indicating their age in this group.

Only one respondent ($\underline{n} = 1$, 0.4%) indicated his/her age as between 66 and 75 years.

Table 1 illustrates data regarding the sample's age distribution.

Table 1
Age Distribution of Adult Clients Presenting for Nurse Practitioner Delivered Health Care Services

Age in Years	\underline{n}^a	Percentage
18-25	36	12.8
26-35	87	31.0
36-45	74	26.3
46-55	65	23.1
56-65	18	6.4
66-75	1	0.4
76-85	0	0.0
86 and older	0	0.0
Total	281	100.0

^aNineteen respondents failed to respond to the age item on the questionnaire.

Gender

Regarding gender of the adult clients seeking nurse practitioner provided health care; the majority of the respondents ($\underline{n} = 246$, 83.4%) indicated their gender as female. Forty-nine subjects (16.6%) reported their gender as male. Five of the 300 study subjects failed to indicate their gender on the instrument.

Marital Status

Respondents were additionally described on the variable "Marital Status." The majority of the subjects ($\underline{n} = 195$, 67.2%) reported that they were either married or

cohabitating. Forty-nine ($\underline{n} = 49$, 16.9%) indicated that they were single and had never married. Marital status data for the respondents is illustrated in Table 2.

Table 2
Marital Status Reported by Adult Clients Presenting for Nurse Practitioner Delivered Primary Health Care Services

Marital Status	\underline{n}^a	Percentage
Married/Cohabiting	195	67.2
Single/Never Married	49	16.9
Divorced	33	11.4
Separated	9	3.1
Widowed	4	1.4
Total	290	100.0

^aTen study participants did not respond to this item.

Highest Educational Level Completed

Regarding the highest level of education completed by the respondents, the largest group ($\underline{n} = 90$, 30.3%) reported completion of a Bachelor of Arts or Science degree. The second largest group ($\underline{n} = 70$, 23.6%) reported “Some College” as the highest level of education completed. Two respondents ($\underline{n} = 2$, 0.7%) reported a doctorate as the highest level of education completed. Table 3 illustrates data regarding the highest level of education completed by the respondents.

Table 3
Highest Level of Education Completed by Adult Clients Seeking Nurse Practitioner
Delivered Primary Health Care Services

Level of Education	<u>n</u> ^a	Percentage ^b
Less than High School	3	1.0
High School/GED	47	15.8
Some Vocational/Technical	13	4.4
Vocational/Technical	19	6.4
Some College	70	23.6
Associate Degree	35	11.8
Bachelor of Arts/Science	90	30.3
Master of Arts/Science	18	6.1
Doctorate	2	0.7
Total	297	100.0

^aThree respondents did not indicate their highest level of education.

^bTotal rounded to 100.0%

Race

The fifth variable on which the subjects were described was race. The majority of the adult client study participants reported their race as “Caucasian” (n = 230, 79.3%). Fifty-seven participants indicated their race as “African American” (n = 57, 19.7%). One participant indicated his/her racial background as “Asian” (n = 1, 0.3%), one participant indicated his/her race as “Hispanic” (n = 1, 0.3%), and one adult healthcare client indicated his/her race as “Other” (n = 1, 0.3%), but failed to indicate the interpretation of

“Other.” Ten ($\underline{n} = 10$, 3.3%) adult clients seeking nurse practitioner delivered health care services failed to indicate their racial background.

Health Insurance

Respondents were also asked to indicate their type of personal health insurance coverage. The majority ($\underline{n} = 215$, 75.7%) indicated that they were insured by The Study Hospital’s Health Plan. The next largest group ($\underline{n} = 26$, 9.2%) indicated “Blue Cross Blue Shield” as their insurance provider. Data regarding health insurance providers of study respondents is illustrated in Table 4.

Table 4
Health Insurance Type Indicated by Adult Clients Presenting for Nurse Practitioner
Delivered Primary Health Care Services

Health Insurance Type	\underline{n}^a	Percentage ^c
The Study Hospital’s Health Plan	215	75.7
Blue Cross Blue Shield	26	9.2
United Health Care	10	3.5
Cigna	8	2.8
State Group	5	1.8
Ochsner	3	1.1
Aetna	2	0.7
Medicare/Medicaid	0	0.0
Other ^b	15	5.3
Total	284	100.0

^aSixteen study participants failed to indicate their health insurance type
(Table continued)

^bFifteen respondents selected the category “Other” and indicated the following responses: FARA (\underline{n} =3), Gilsbar (\underline{n} =1), PHCS (\underline{n} =2), Southeastern Student Health Insurance (\underline{n} =1), None (\underline{n} =7). One respondent indicating “Other” failed to specify a type of health insurance.

^cTotal rounded to 100.0%

Yearly Net Income

Adult clients presenting to the clinic for primary health care services were also asked to provide information regarding their yearly net income. The largest number of respondents (\underline{n} = 136, 48.1%) reported that their incomes fell within the range of \$25,001 - \$50,000. The smallest number of respondents (\underline{n} = 14, 4.9%) reported incomes in the “Greater than \$100,000” range. Table 5 illustrates data regarding yearly net incomes of survey participants.

Table 5
Yearly Net Incomes as Reported by Adult Clients Presenting for Nurse Practitioner Delivered Primary Health Care Services

Income Range in United States Dollars	\underline{n}^a	Percentage
Less than 25,000	61	21.6
25,001-50,000	136	48.1
50,001-75,000	49	17.3
75,001-100,000	23	8.1
Greater than 100,000	14	4.9
Total	283	100.0

^aA total of 17 participants failed to respond to this item on the survey instrument.

Employment Status

Participants were also asked to provide information regarding their employment status. The respondents were asked to select the category that best represented their

current employment status: “Full time,” “Part time,” “PRN (as needed),” “Contract,” “Retired”, and “Unemployed.” The category reported by the majority of respondents was “Full time” ($n = 216$, 74.2%). The second largest group reported their work status as part time ($n = 41$, 14.1%). Information regarding employment status of respondents is provided in Table 6.

Table 6
Employment Status Indicated by Adult Clients Presenting for Nurse Practitioner Provided Primary Health Care Services

Employment Status	n^a	Percentage ^b
Full Time	216	74.2
Part Time	41	14.1
PRN	23	7.9
Unemployed	7	2.4
Contract	3	1.0
Retired	1	0.3
Total	291	100.0

^aNine respondents failed to indicate an employment status.

^bTotal rounded to 100.0%

Patient Type

The respondents were also described on the variable “Patient Type.” The majority of adult clients presenting for nurse practitioner provided primary health care services indicated that they were employees of the clinic study site ($n = 246$, 82.8%), while 46 participants (15.5%) indicated that they were adult family members of employees of the

study site. Additionally, five respondents indicated that they were “Contract Employees” ($n = 5$, 1.7%), while three participants failed to respond to this item.

Degree of Illness

Clients seeking nurse practitioner delivered primary health care services at the Employee Health Clinic were additionally asked to subjectively rate the degree of illness and/or injury necessitating the current desire to seek medical attention by choosing from the categories “Very ill,” “Moderately ill,” “A little ill,” or “Not ill.” Regarding the degree of current illness, the largest number of respondents indicated that they were “A little ill” ($n = 129$, 44.3%). The second largest number of respondents indicated that they were “Moderately ill” ($n = 93$, 32.0%), while 18.6% ($n = 54$) indicated that they were “Not ill,” and 15 respondents (5.2%) indicated that they were “Very ill.” Nine respondents failed to respond to this item on the instrument.

Degree of Injury

Each participant was additionally asked to indicate his or her subjective perceptions of the degree of injury prompting the desire to seek health care by choosing from the responses “Very injured,” “Moderately injured,” “A little injured,” or “Not injured.” The majority ($n = 259$, 89.9%) indicated that they were “Not injured,” while 15 (5.2%) reported being “A little injured,” and 14 (4.9%) reported being “Moderately injured.” None (0.0%) reported being “Very Injured.” Twelve participants failed to respond to this item on the questionnaire.

Health Problems

Respondents were also asked to indicate the number of current health problems that necessitated medication administration. A total of 186 (62%) of the 300 participants

reported one or more medication dependent health problems. Respondents were asked to designate all applicable current health problems, and multiple problems were listed by 55 of the participants. A total of 114 (38%) of the participants indicated that they currently experienced no health problems necessitating medication administration. The most frequently reported health problem indicated by the respondents was “High blood pressure.” ($n = 47$), while “Cancer” ($n = 1$) and “HIV” ($n = 1$) were the least frequently reported health conditions. Table 7 illustrates data regarding health problems requiring medication as reported by the participants.

Table 7
Medication Dependent Health Problems as Reported by Adult Clients Presenting for Nurse Practitioner Delivered Primary Health Care Services

Health Problem Reported	n	Percentage of Total Sample ($N=300$)
High Blood Pressure	47	15.7
Depression/Anxiety	34	11.3
Hypercholesterolemia	24	8.0
Thyroid Disease	20	6.7
Diabetes	14	4.7
Asthma/Lung/Breathing	13	4.3
Heart Disease	3	1.0
Cancer	1	0.3
HIV	1	0.3
Other ^a	84	28.0
Total ^b	241	80.3

(Table continued)

^aOf the 84 survey participants responding “Other,” seven provided defining information, including “enlarged lymph nodes,” “menopause,” “allergies,” “hormone deficiency,” “BCP’s,” “none,” and “HRT.”

^bThe total number will not sum to 100 due to the respondents ability to select multiple categories

Daily Prescription Medication

Of the 249 participants providing information on the number of prescription medications taken daily, the majority of respondents ($n = 188$, 75.5%) indicated taking one or more prescription medications per day. The mean number of prescription medications taken for the group was 1.65 ($SD = 1.614$). Table 8 illustrates the number of daily prescription medications as reported by the respondents.

Table 8
Number of Daily Prescription Medications Taken as Reported by Adult Clients
Presenting for Nurse Practitioner Delivered Primary Health Care Services

Number of Prescription Medications	n^a	Percentage ^b
0	61	24.5
1	86	34.5
2	41	16.5
3	30	12.0
4	16	6.4
5	5	2.0
6	6	2.4
7	3	1.2
8	1	0.4
Total	249	100.0

^aFifty-one respondents failed to indicate a number of daily prescription medications.

^bTotal rounded to 100.0%

Number of Visits to a Health Care Provider in the Last Year

Adult clients of the nurse practitioner in Employee Health were asked to additionally indicate the number of times in the past year that they had visited each of the following: a physician, a nurse practitioner, and a physician assistant. For each of the provider types, respondents were asked to indicate the number of visits by choosing from the categories, “None,” “1-5,” “6-10,” “11-15,” or “16 or more.” The highest numbers of visits were to physicians ($\underline{n} = 293$), while the second largest number of overall patient visits within the past year were to nurse practitioners ($\underline{n} = 276$). The majority of patients indicated that they had visited their physician between 1 and 5 times within the past year ($\underline{n} = 230$, 78.5%). A total of 218 clients (79.0%) indicated that they had visited their nurse practitioner between 1 and 5 times within the past year. No respondents reported visiting the nurse practitioner for 16 or more visits, while 3 (1.0%) reported 16 or more physicians’ visits within the past year. A total of 234 clients (90.3%) reported that they had not seen a physician assistant in the past year. The largest group reporting visits with physician assistants ($\underline{n} = 21$, 8.1%) indicated between 1 and 5 visits within the past year. Table 9 reflects responses regarding client health care visits with individual health care provider types.

Table 9

Frequency of Health Care Visits in the Past Year by Provider Type as Reported by Adult Clients Seeking Nurse Practitioner Delivered Primary Health Care Services

Number of Health Care Visits	Provider Type		
	Physician ^b	Nurse Practitioner ^a	Physician Assistant ^c
None	39	35	234 (Table continued)

1-5	230	218	21
6-10	14	21	3
11-15	7	2	1
16 or more	3	0	0
Total	293	276	299

^aTwenty-four respondents did not indicate a number of nurse practitioner visits within the last year.

^bSeven respondents failed to indicate the number of annual visits to physicians within the past year.

^cForty-one respondents failed to indicate the total annual visits to physician assistants.

Number of Visits to Nurse Practitioner in Employee Health Services

Respondents were additionally asked how many times they had visited the nurse practitioner in the Employee Health Services Clinic in the past year. The majority (\underline{n} = 265, 89.2%) responded, “1-5” times, while 28 respondents (9.4%) indicated “6-10” visits in the past year. Four respondents (1.3%) indicated, “11-15” times, while three respondents failed to reply to this item on the survey instrument.

Satisfaction with Provider of Health Care

Respondents were also asked to indicate the health care provider type with whom they had been most satisfied. The categories provided included “Physician,” “Nurse Practitioner”, and “Physician Assistant.”. The majority of participants (\underline{n} = 206, 69.4%) indicated the most satisfaction from nurse practitioners, while 89 (30%) indicated physician. Two respondents (0.7%) indicated the greatest satisfaction from physician assistants. Three participants failed to provide an answer to this item.

Satisfaction with Health Education from Health Care Provider

Respondents were additionally asked to indicate the health care provider type whom they felt had provided the best health education from the categories “Nurse Practitioner,” “Physician,” and “Physician Assistant.” Again, the majority of respondents indicated “Nurse Practitioner” ($n = 232$, 79.5%). The second largest category was “Physician,” ($n = 59$, 20.2%). One respondent (0.3%) indicated “Physician Assistant,” while eight respondents failed to indicate a response.

Objective Two

Research objective two was to determine overall patient satisfaction with care delivered by a NP at a not for profit hospital in the Southern portion of the US as measured by the Nurse Practitioner Satisfaction Survey. In order to achieve this objective, individual patient satisfaction scores were computed for each participant following exploratory factor analysis with principal axis factoring and promax rotation of the 28 interval level instrument variables. Exploratory factor analysis was further employed to determine the existence of latent constructs in addition to general satisfaction that might evolve and contribute to defining and explaining the broader overall concept of satisfaction with nurse practitioner delivered primary health care services. The specific variables loading on the construct overall general satisfaction were summed to calculate each subject’s ($n = 299$) individual satisfaction score.

Factor analysis calculations initially revealed a Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy value of 0.959. The KMO value tests whether the partial correlations among variables are small. Values equal to or greater than 0.5 are desired and acceptable, and therefore sampling adequacy was determined to be acceptable for the

300 subjects for whom data was entered. Additionally, Bartlett's Test of Sphericity was performed. Bartlett's Test of Sphericity tests the hypothesis that the variables in the population correlation matrix are uncorrelated. Significance levels of 0.05 or lower indicate that the strength of the relationships between variables is strong and acceptable for factor analysis (University of Newcastle Upon Tyne, 2005). Approximate Chi Square value for the dataset was calculated to be acceptable at 10542.214 ($df = 378$, $p = < .001$). Additionally, at least 20% of the correlations in the anti image correlation exceeded 0.03, and measures of sampling adequacy (MSA's) all exceeded the 0.5 threshold, deeming the model acceptable for factor analytic statistical techniques.

An initial exploratory factor analysis solution utilizing principal axis extraction, promax oblique rotation and requesting eigenvalues over the numerical value of one was performed. Mean substitution was utilized for missing data fields for Likert-type data only so that data from the full sample of 300 participants could be retained for analysis. This initial model yielded a solution with the highest three eigenvalues noted to be 18.475, 1.407, and .997 respectively. These three initial factors were demonstrated to explain approximately 74.57% of the variance in patient satisfaction with nurse practitioner delivered primary health care services. Catell scree plot visual examination was additionally employed, revealing a slight flattening of the curve between factors two and six and therefore suggesting an optimal factor solution of between two and six.

Factor solutions were subsequently evaluated and compared for the two through six factor models using the following acceptability criteria: simple structure, high loadings, presence or absence of crossloadings, percent of variance accounted for, interpretability/practicality, name/identification, specific factors, and problem existence

such as under or over factoring. Models exhibiting simple structure contain variables that load highly on one factor. Optimal loading value for items in the study was determined to be 0.4, however after comparison to other factors, lower loadings were also considered. Crossloading items load significantly on more than one factor, while specific factors are factors with only one loading and usually indicate an overfactoring problem in the analysis (Crocker & Algina, 1986). Items that loaded on primary factors with values of at least 0.4 and that additionally loaded on secondary factors with values of 0.3 and higher were considered as crossloading items in the study.

The two-factor solution resulted in a model that explained 68.52% of the variance of patient satisfaction with nurse practitioners. For this model, a total of 22 variables loaded on the first factor, with numerical loading values ranging from .975 to .510. Loading values on the second factor ranged from .957 to .440. Variables 19 (the nurse practitioner was interested in my health concerns) and 24 (the nurse practitioner explained things in an understandable manner) appeared to crossload on both factors. The two-factor model was subsequently rejected due to lack of evidence in meeting the criteria stated above, poor interpretability and practical meaning, as well as the possibility of model underfactoring.

The three-factor solution was then explored and resulted in a model that explained 70.77% of the variance. Eighteen variables with loadings ranging from .916 to .391 were noted to load on factor one. Six variables loaded on factor two with numerical loading values noted to range from .888 to .435. Factor three contained four variables with loadings ranging from .748 to .535. The model consisted of only one variable, item 24 (nurse practitioner explained things in an understandable manner), which appeared to

crossload on all three factors with loadings of .391, .376, and .221 respectively. The three factor model met the criteria of simple structure, high loadings, low crossloadings incidence, accounted for over 70% of the variance, was easily interpreted, appeared to be practical, and contained latent constructs which were easily identified and labeled as factors indicating overall satisfaction, communication, and scheduling. Overfactoring was not determined to be problematic, and this model was ultimately determined to best represent the overall broad concept of patient satisfaction with nurse practitioner delivered primary health care services.

The four-factor model was subsequently examined. This model explained 73.10% of the variance and contained 16 variables that loaded on factor one, six that loaded on factor two, four that loaded on factor three and two that loaded on factor four. Crossloadings did not appear to be problematic; however the pattern and distribution of variables under factor four appeared impractical and difficult to interpret and name. Overfactoring was additionally considered to be a problem, and the model was subsequently rejected.

The five-factor model explained 74.77% of the variance but contained crossloadings with three of the variables. Additionally, factor five of this model contained only one single variable. This model was determined to possibly represent overfactoring and to be problematic; as a result it was rejected. The six-factor model was also rejected. Although it explained 75.87% of the variance, factor five contained only a single variable with a loading of .662. None of the 28 items loaded dominantly on factor six. The six factor solution was determined to represent overfactoring, was difficult to interpret, appeared impractical, and was subsequently rejected as an appropriate model fit for

defining latent constructs of the concept patient satisfaction with nurse practitioner delivered primary health care services.

After comparing and statistically analyzing factor solutions ranging from two to six, the three-factor model was ultimately accepted as a determination regarding its applicability, practicality, and interpretability appeared obvious. Table 10 reflects variance distributions and eigenvalues (sum of factor squared loadings) for the initial, three-factor, and three-factor rotated solutions.

Table 10
Summed Squared Factor Loadings and Total Variance Explained for the Three Factor Extraction and Rotated Factor Solutions for Items Representing the Nurse Practitioner Satisfaction Survey

Factor	Three-Factor Solution	Percentage of Variance	Rotated Model
1	18.243	65.154	17.626
2	.969	3.462	14.352
3	.602	2.152	12.577

The three identified factors were determined to represent and were consequently labeled to represent the underlying latent constructs of “general satisfaction,” “communication,” and “scheduling.” These factors with associated item loadings in bold print are reflected in Table 11. A total of 18 items with loadings ranging from .391 to .994 were noted for factor one, “general satisfaction.” Six variables with factor loadings ranging from .435 to .888 were associated with factor two, “communication,” and four items with loadings ranging from .535 to .748 were noted for factor three, “scheduling. Item 24 (NP explained things in an understandable manner) appeared to crossload on

factors one and two, “satisfaction” and “communication,” with loadings of .391 and .376 respectively.

Table 11
Variables and Factor Loadings for Items Representing the Nurse Practitioner Satisfaction Survey for the Rotated Three Factor Solution Using Principle Axis Factoring and Promax Rotation

Variable	Factor 1 Satisfaction	Factor 2 Communication	Factor 3 Scheduling
Satisfied with time NP spent with me (#13)	.994	.084	-.199
NP is knowledgeable about health problems (#15)	.937	.059	-.089
Will use NP again (#3)	.911	-.170	.116
Satisfied with how NP treated me (#12)	.887	.106	-.059
NP is caring (#14)	.874	-.019	.069
NP respected me (#20)	.870	-.004	.054
Trust NP (#16)	.858	.006	.078
Overall satisfied with NP visit (#1)	.823	-.100	.212
Recommend NP (#2)	.723	-.105	.273
NP discusses treatment other than medication(#11)	.694	-.136	.129
NP was not rushed (#4)	.662	.019	.123
NP knows when to refer or consult with MD (#17)	.659	-.032	.118

(Table continued)

Understood what NP explained (#22)	.611	.289	.060
NP was interested in my health concerns (#19)	.610	.385	-.037
Rather see NP than MD (#5)	.575	-.162	.089
NP listened to me (#18)	.549	.298	.131
NP is a skilled health care provider (#10)	.537	.106	.293
NP explained things in understandable manner (#24)	.391	.376	.221
Comfortable asking NP questions (#25)	.128	.888	-.065
Comfortable asking MD questions (#26)	-.306	.876	.053
Easy to talk to NP about health concerns (#21)	.093	.740	.083
Left NP visit with all questions answered (#27)	.290	.717	-.040
Understood what NP taught me (#23)	.373	.516	.025
Usually leave MD visit with all questions answered (#28)	-.165	.435	.072
Get appointment without a problem (#7)	-.008	.210	.748
EH Clinic is easy to access (#8)	.256	.096	.628

(Table continued)

Convenient appointment (#6)	.138	.061	.560
EH Clinic scheduling is easier than MD office (#9)	.145	-.016	.535

Since items 1, 2, 3, 4, 5, 12, and 13 specifically either referenced or included the term “satisfaction”, the a priori hypothesis regarding the inclusion of these specific items in each subject’s patient satisfaction score was not rejected, as items 1,2,3,4,5,12, and 13 were determined to be among the 18 items which loaded on the first construct “general overall satisfaction” with nurse practitioner delivered primary health care services.

In calculating the patient satisfaction and subscale scores, respondents were asked to indicate the degree to which they agreed or disagreed with each of the 28 variables on the 5 point Likert-type type scale. Responses included “1 = Strongly Disagree,” “2 = Disagree,” “3 = Undecided,” “4 = Agree,” and “5 = Strongly Agree.” All 18 of the variables noted to load highly on factor 1, “general satisfaction” were noted to be negatively skewed with values ranging from -1.298 for “Rather see NP than MD (#5)” to -6.862 for “Overall satisfied with NP visit (#1).” Distribution of responses was additionally noted to be leptokurtic with values ranging from 1.098 for item five “Rather see NP than MD” ($\underline{M} = 4.32$, $\underline{SD} = 884$) to 58.902 for item one “Overall satisfied with NP visit” ($\underline{M} = 4.91$, $\underline{SD} = .4037$). Table 12 reflects variable means and standard deviations employing mean imputation for missing data for the 18 items determined to load on factor one, the construct general satisfaction.

Table 12
Factor One (Satisfaction Score) Variables, Means, and Standard Deviations for Items
Representing General Satisfaction on the Nurse Practitioner Satisfaction Survey

Variable	<u>N</u> ^a	<u>M</u> ^b	<u>SD</u>
Overall satisfied with NP visit (#1)	299	4.91	.404
NP respected me (#20)	300	4.90	.413
NP is caring (#14)	300	4.90	.416
Satisfied with how NP treated me (#12)	300	4.88	.454
NP listened to me (#18)	300	4.87	.437
Satisfied with time NP spent with me (#13)	300	4.87	.484
Will use NP again (#3)	299	4.87	.491
Would recommend NP to others (#2)	299	4.87	.441
NP was interested in my health concerns (#19)	300	4.87	.472
NP knowledgeable about health problems (#15)	300	4.86	.480
NP explained things in an understandable manner (#24)	298	4.86	.474
Understood what NP explained (#22)	298	4.86	.474
NP is a skilled health care provider (#10)	299	4.85	.464

(Table continued)

Trust NP (#16)	300	4.85	.480
NP was not rushed (#4)	300	4.82	.560
NP knows when to refer/consult with MD (#17)	299	4.74	.600
NP discusses treatment besides medications (#11)	299	4.70	.654
Rather see NP than MD (#5)	296	4.32	.884

^aNot all participants responded to each survey item

^bMean values based on the 5 point Likert-type type response scale 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree.

Factor two, its associated variable loadings, means, and standard deviations calculated using mean imputation for missing data are reflected in Table 13. The variable with the highest mean value loading on factor two, the communication subscale score was item 27, “Left NP visit with all questions answered” ($\underline{M} = 4.84$, $\underline{SD} = .508$). The item with the lowest mean value associated with the communication subscale score was item 28, “Usually leave MD visit with all questions answered” ($\underline{M} = 4.20$, $\underline{SD} = 1.048$).

Table 13
Factor Two (Communication Score) Variables, Means, and Standard Deviations for Items Representing Communication Satisfaction on the Nurse Practitioner Satisfaction Survey

Variable	\underline{n}^a	\underline{M}^b	\underline{SD}
Left NP visit with all questions answered (#27)	297	4.84	.508
Comfortable asking NP questions (#25)	299	4.82	.536
Easy to talk to NP about health concerns (#21)	299	4.82	.523

(Table continued)

Understood what NP taught me (#23)	299	4.79	.550
Comfortable asking MD questions (#26)	299	4.63	.704
Usually leave MD visit with questions answered (#28)	298	4.20	1.048

^aNot all participants responded to each survey item

^bMean values based on the 5 point Likert-type response scale 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree.

Factor three, representing the scheduling score was comprised of four variables related to the patient's overall experience with scheduling a clinic appointment. The variable comprising this score with the highest mean value was item eight, "Employee Health Clinic is convenient" ($\underline{M} = 4.88$, $\underline{SD} = .435$), while the lowest mean score was associated with variable nine, "Employee Health scheduling is easier than an MD office" ($\underline{M} = 4.74$, $\underline{SD} = .653$). Factor three variables and associated means and standard deviations employing mean imputation for missing data are illustrated in Table 14.

Table 14
Factor Three (Scheduling Score) Variables, Means, and Standard Deviations for Items Representing Scheduling Satisfaction on the Nurse Practitioner Satisfaction Survey

Variable	\underline{n}^a	\underline{M}^b	\underline{SD}
EH Clinic is convenient (#8)	299	4.88	.435
Convenient appointment (#6)	300	4.84	.529
Get appointment without a problem(#7)	300	4.83	.476
EH Clinic scheduling easier than MD office (#9)	299	4.74	.653

(Table continued)

^aNot all participants responded to each survey item. Cases with missing data were excluded from summed analysis.

^bMean values based on the 5 point Likert-type type response scale 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree.

Correlations between the factors or subscales were subsequently analyzed. Table 15 reflects values representing correlations between the factors extracted from the three-factor model. Correlations were analyzed according to Davis's (1971) descriptors of association (.00-.09 = negligible, .10-.29 = low, .30-.49 = moderate, .50-.69 = substantial, .70 and higher = very strong). A very high level of positive correlation consistent with and reflecting the complex, multifaceted, and interrelated concept of patient satisfaction with nurse practitioner delivered primary health care services was demonstrated by the values represented. Although the correlations unsurprisingly demonstrate elevated levels of interrelationship between the latent constructs representing patient satisfaction, the distinct, unique and exclusive nature and characteristics of the individual concepts reflected demonstrates a distinct separateness and divergence which justifies, validates, and substantiates their existence as discrete entities.

Table 15
Factor Correlations between the Constructs "Satisfaction," "Communication," and "Scheduling"

	<u>r</u>		
	Satisfaction	Communication	Scheduling
Satisfaction			
Communication	.806		
Scheduling	.754	.644	

Three subscales representing participants' assessments of "general satisfaction," "communication," and "scheduling" were formulated and developed from data generated from the exploratory factor analysis. Individual items for the three subscales consisted of those original 28 interval level items that loaded on each of the three identified factors. Subscale one "general satisfaction" consisted of 18 items, subscale two "communication" consisted of six items, and subscale three "scheduling" consisted of four items.

Cronbach's alpha measure of internal consistency was subsequently calculated for the entire instrument as well as for the individually formulated subscales. Cronbach's alpha measure of internal consistency reflects the degree to which the variables measure a latent construct or factor (Crocker & Algina, 1986). Table 16 reflects factor names, numbers of items, Cronbach's alpha reliability measures, means, standard deviations, skewness, and kurtosis for each of the three factors/subscales derived from the final solution. Although data appeared to be negatively skewed and leptokurtic, reflecting overall high levels of overall patient satisfaction, reliability was noted to be consistently high and acceptable.

Table 16
Names, Number of Items, Reliability, Means, Standard Deviations, Skewness, and
Kurtosis of Factors Derived from the Three Factor Solution

Factor/Scale	Number of Items	Reliability ^a	<u>M</u> ^b	<u>SD</u>	Skewness	Kurtosis
Nurse Practitioner Satisfaction Survey (NPSS)	28		134.50 / 140	11.54	-6.143	9.778
Satisfaction	18	.978	86.86 / 90	7.66	-5.882	45.355
Communication	6	.828	28.16 / 30	2.86	-3.610	21.543
Scheduling	4	.759	19.32 / 20	1.74	-5.285	39.547

(Table continued)

^aCronbach's alpha measure of internal consistency and reliability

^bMean values based on the 5 point Likert-type type response scale 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree

Objective Three

Objective three was to compare patient satisfaction scores as determined from factor analysis loadings on the construct general satisfaction among the groups or levels within the following demographic variables:

- a. Gender
- b. Race
- c. Age
- d. Marital status
- e. Highest educational level completed
- f. Type of health insurance coverage
- g. Yearly net income
- h. Patient type
- i. Employment status
- j. Subjective patient report of degree of illness and/or injury resulting in desire to seek medical attention.

Prior to comparison, data were examined for normality, outliers, and distribution using Statistical Package for the Social Sciences (SPSS) version 12.0. Alpha was controlled for in all tests at the .05 level of significance.

Individual patient satisfaction subscale scores were calculated by adding the Likert-type responses indicated by the subjects to each of the 18 variables determined to load on factor one, general patient satisfaction. Based on summed information from the 18 items

loading on factor one, general patient satisfaction subscale scores were noted to range from 18.00 to 90.00, with a score of 90.00 being the highest possible. The mean patient satisfaction score for the sample was determined to be 86.86 ($n = 288$). The distribution of the dependent variable, general satisfaction subscale scores, was determined to be negatively skewed (-5.882 , $SE = .144$) and leptokurtic (45.355 , $SE = .286$). Graphic illustration of the data through box plot examination of the distribution of patient satisfaction scores revealed the possibility of the presence of two outlier cases as illustrated in Figure 1.

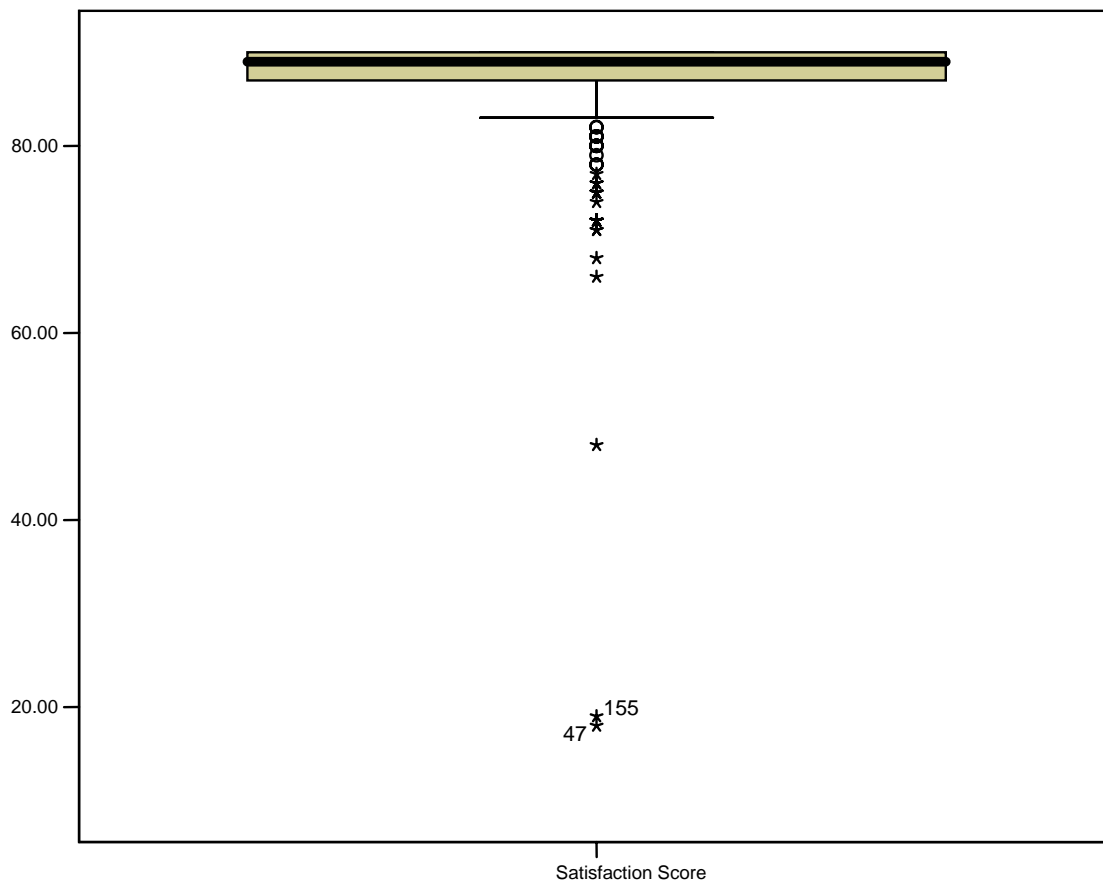


Figure 1
Boxplot Examination of Patient Satisfaction Scores among Nurse Practitioner Clients

Outliers were thought to exist as a result of either confusion in interpreting the Likert-type scale direction or in actual levels of dissatisfaction with nurse practitioner delivered primary health care services. The sample included several subjects seen as a result of work injuries and classified as workers' compensation cases. On at least one occasion during the research study an employee sustaining a workplace injury was seen by the nurse practitioner as the result of an administrative mandate following a reported injury and subsequent refusal of the employee to report to work. This employee was noted to express overt irritation and disgruntlement with the apparent forced visit, but was nonetheless requested to complete the survey. As a goal of the study was to capture the perceived satisfaction level of all clients presenting for nurse practitioner care in the occupational setting, a decision to allow all cases to remain in the dataset for analysis was therefore made, and comparison analysis proceeded with the deletion of no outliers.

Gender

A comparison in patient satisfaction scores between males and females was accomplished through calculation of an independent samples t test. Mean satisfaction scores for males ($n = 49$, $M = 86.61$, $SD = 4.765$) were slightly lower than scores for females ($n = 235$, $M = 87.23$, $SD = 6.819$). Sample sizes, mean satisfaction scores, and results for comparison by gender are illustrated in Table 17.

Table 17
Group Sizes, Mean Patient Satisfaction Subscale Scores, and Standard Deviations by Gender for Respondents of the Nurse Practitioner Satisfaction Survey

Gender	n^a	Satisfaction Score M^b	SD
Male	49	86.61	4.764

(Table continued)

Female	235	87.23	6.819
Total ^c	284	87.12	6.508

^aSixteen respondents failed to either indicate gender or provide data required for calculation of patient satisfaction scores on the survey.

^bMean values based on the 5 point Likert-type type response scale 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree.

^cReported as overall mean and standard deviation

Levene's Test for Equality of Variances exceeded the .05 level, resulting in a failure to reject the homogeneity of variance hypothesis of no difference between the two gender groups, males and females, and the subsequent determination of equal variances among the groups, $F = .082(48, 234)$, $p = .775$. An independent t test analysis with equal variances assumed resulted in the determination of no statistically significant differences in patient satisfaction scores by gender at the .05 two tailed level of significance, $t = -.599(282)$, $p = .549$. Although the mean general satisfaction subscale scores for females were noted to be slightly higher than those for males, the differences were determined not to be statistically significant.

Race

Comparisons for differences in patient satisfaction were calculated for the variable "Race" following collapse and recoding of the levels of racial background into the dichotomy "Non-Caucasian" and "Caucasian." This maneuver was performed in an effort to reduce the danger of achieving spurious results after statistical analysis revealed that the race categories, "Other," "Hispanic," and "Asian" each contained only one subject.

The sample was recoded to include "Caucasians" as indicated per survey response, and "Non-Caucasian" which included the combined levels of "African American,"

“Asian,” “Hispanic,” and “Other” as indicated by the subjects’ responses. Mean scores were similar between Non-Caucasians ($n = 55$, $M = 86.46$, $SD=7.591$) and Caucasians ($n = 224$, $M = 86.99$, $SD= 7.745$). Table 18 reflects mean satisfaction scores, standard deviations, racial group distributions, and sample sizes by race for the recoded sample.

Table 18
Sample Sizes, Mean Patient Satisfaction Subscale Scores, and Standard Deviations by Recoded Racial Group Distributions for Nurse Practitioner Satisfaction Survey Respondents

Racial Group	n^a	Satisfaction Score	
		M^b	SD
Non-Caucasian	55	86.46	7.591
Caucasian	224	86.99	7.745
Total ^c	279	86.89	7.704

^aTwenty-one respondents failed either to indicate racial background or provide data necessary for calculation of patient satisfaction scores on the survey.

^bMean values based on the 5 point Likert-type type response scale 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree.

^cReported as overall mean and standard deviation

Following recoding procedures an independent t test was performed to determine the existence of differences between “Caucasians” and “Non-Caucasians.” Levene’s statistic was noted to exceed the .05 level, $F = 1.4286(54, 223)$, $p = .233$, resulting in the assumption of homogeneity of variance between the two racial groups. Independent t test analysis for equal variances assumed revealed no statistically significant differences in patient satisfaction with primary health care services delivered by a nurse practitioner between Caucasians and Non-Caucasians, $t = -.466(277)$, $p = .642$.

Age

Analysis of frequency distributions for levels of the variable “Age” resulted in the detection of the age category “66-75” containing only one subject. This variable was recoded to reflect a collapsing of the “66-75” group into the preceding category “56 -65” with renaming of the new category as “56 and older.” Mean satisfaction scores ranged from the highest demonstrated by the 56 and older group ($\underline{n} = 19$, $\underline{M} = 88.74$, $\underline{SD} = 4.094$) to the lowest demonstrated by the 18 to 25 year olds ($\underline{n} = 34$, $\underline{M} = 83.12$, $\underline{SD} = 16.821$). Table 19 reflects recoded levels of the variable “Age” with associated mean satisfaction scores, and standard deviations.

Table 19
Sample Sizes, Mean Patient Satisfaction Subscale Scores, and Standard Deviations by
Recoded Age Group Distributions for Nurse Practitioner Satisfaction Survey
Respondents

Age Group	\underline{n}^a	Satisfaction Score \underline{M}^b	\underline{SD}
18-25	34	83.12	16.821
26-35	87	86.44	6.682
36-45	70	87.89	4.258
46-55	61	87.82	4.145
56 and older	19	88.74	4.094
Total ^c	271	86.87	7.805

^aThirty-nine respondents failed to either report their age or indicate complete data required for calculation of patient satisfaction scores on the survey.

^bMean values based on the 5 point Likert-type type response scale 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree.

^cReported as overall mean and standard deviation

Differences between levels of the variable “Age” were determined through calculation and interpretation of the Welch test following failure of the Levene’s Test for Equality of Variance to demonstrate homogeneity of variance between the different age groups $F = 6.625 (4, 266)$, $p = <.001$. A decision was made to therefore abort the original intent to calculate mean differences through the Oneway Analysis of Variance and to calculate the Welch statistic. Results demonstrated no differences between the mean satisfaction scores by age groups at the .05 two tailed level after differences in variance were considered through calculation of the Welch statistic, $1.707 (4, 84.264)$, $p = .156$.

Marital Status

Levene’s Test of Homogeneity of Variance was noted to be $F = 5.443 (4, 274)$ $p = <.001$ for levels of the variable “Marital status.” Welch statistic analysis for marital status ensued after determination of the existence of unequal variances among levels of the variable. The highest mean satisfaction scores were noted for the “Separated” group ($n = 9$, $M = 89.67$, $SD = .500$), while the lowest mean satisfaction scores were noted for the “Single Never Married” category ($n = 44$, $M = 83.34$, $SD = 12.828$). Table 20 illustrates group sizes, mean scores, and standard deviations by reported marital status.

Table 20
Sample Sizes, Mean Patient Satisfaction Subscale Scores, and Standard Deviations by Marital Status Distributions for Nurse Practitioner Satisfaction Survey Respondents

Marital Status	n^a	Satisfaction Score	
		M^b	SD
Single Never Married	44	83.34	12.828
Married/Cohabiting	190	87.66	6.240

(Table continued)

Separated	9	89.67	0.500
Divorced	32	86.75	5.897
Widowed	4	84.00	8.485
<hr/>			
Total ^c	279	86.89	7.577

^aTwenty-one subjects failed to either report marital status or provide data sufficient for calculation of patient satisfaction scores on the survey.

^bMean values based on the 5 point Likert-type type response scale 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree.

^cReported as overall mean and standard deviation

The Welch test, after accounting for the variance among the group mean satisfaction scores, was noted to be highly significant for differences among the marital status groups, 7.952 (4, 20.353), $p = <.001$. Scheffe post hoc analysis following the Welch test indicated significant differences between the “Single Never Married” ($\underline{M} = 83.34$, $\underline{SD} = 12.828$) and the “Married/Cohabiting” ($\underline{M} = 87.66$, $\underline{SD} = 6.240$) groups ($p = .022$, $\underline{SE} = 1.268$). Married and cohabitating subjects reported statistically significant higher satisfaction with nurse practitioner delivered primary health care services than did those who were single and never married.

Highest Educational Level Completed

Differences in satisfaction scores between the various education level groups were also examined. Group sizes, mean scores, and standard deviations are illustrated in Table 21. The highest satisfaction levels were reported by those with a Masters level education ($\underline{n} = 18$, $\underline{M} = 88.67$, $\underline{SD} = 1.680$), while the lowest scores were noted for those with vocational or technical school education ($\underline{n} = 19$, $\underline{M} = 83.95$, $\underline{SD} = 16.758$).

Table 21
Mean Satisfaction Subscale Scores, Standard Deviations, and Sample Sizes for Highest Education Levels Reported by Nurse Practitioner Satisfaction Survey Respondents

Highest Education Level	<u>n</u> ^a	Satisfaction Score <u>M</u> ^b	<u>SD</u>
Less than High School	3	84.67	4.041
High School/GED	47	87.36	4.976
Some Vocational/Technical	12	87.83	2.949
Vocational/Technical	19	83.95	16.758
Some College	64	85.58	7.462
Associate Degree	33	87.97	3.627
Bachelor of Arts/Science	88	87.34	8.371
Master of Arts/Science	18	88.67	1.680
Doctorate	2	84.50	4.950
Total ^c	286	86.85	7.690

^aSatisfaction scores calculated for those respondents indicating a highest education level and providing data sufficient for score computation. Fourteen respondents provided insufficient data on the survey.

^bMean values based on the 5 point Likert-type type response scale 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree.

^cReported as overall mean and standard deviation

Levene's Test of Homogeneity of Variance resulted in the determination of unequal variances among the various reported educational levels, $F = 2.759 (8, 277)$, $p = .006$.

Welch test analysis was subsequently performed. Although mean satisfaction score group differences were demonstrated, the Welch statistic revealed no statistically significant differences in patient satisfaction scores among the various educational levels

after accounting for the lack of homogeneity of variance among the groups 1.429

(8, 15.804), $p = .259$.

Type of Health Insurance Coverage

Homogeneity of variance estimates among the nine insurance groups reported by the respondents revealed a Levene's statistic of $F = 4.179$, (7, 267), $p = <.001$, and a violation of the assumption of homogeneity of variance. The Welch test was unable to be calculated due to the determination of zero variance in at least one of the groups. Table 22 reflects sample sizes mean satisfaction scores and standard deviations by insurance groupings for respondents. Highest mean satisfaction scores were noted for the "Aetna" group ($n=2$, $M=90.00$, $SD=.000$). Zero variance was noted for both the "Aetna" ($n = 2$, $M = 90.00$, $SD = .000$) and "Ochsner" ($n = 2$, $M = 88.00$, $SD = .000$) groups, thus precluding the calculation of the Welch test because of the lack of group variance noted.

Table 22

Mean Satisfaction Subscale Scores, Standard Deviations, and Sample Sizes for Insurance Groupings Reported by Nurse Practitioner Satisfaction Survey Respondents

Insurance	n^a	Satisfaction Score \underline{M}^c	\underline{SD}
Aetna	2	90.00	.000
Blue Cross Blue Shield	26	87.35	4.009
Cigna	8	88.75	1.389
Ochsner	2	88.00	.000
State Group	5	87.20	3.633
United Health Care	9	89.11	1.691

(Table continued)

The Study Hospital's Health Plan	209	87.15	6.652
Other ^b	14	81.07	19.205
<hr/>			
Total ^d	275	87.00	7.417

^aTwenty-five respondents either failed to indicate an insurance type or failed to provide data sufficient for calculation of a patient satisfaction score.

^bFifteen respondents selected the category "Other" and indicated the following responses: FARA (\underline{n} =3), Gilsbar (\underline{n} =1), PHCS (\underline{n} =2), Southeastern Student Health Insurance (\underline{n} =1), None (\underline{n} =7). One respondent indicating "Other" failed to specify a type of health insurance

^cMean values based on the 5 point Likert-type type response scale 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree.

^dReported as overall mean and standard deviation

Data were subsequently recoded into the dichotomy "Study Hospital's Health Plan" and "Non-Study Hospital's Health Plan" in an effort to reduce the danger of achieving spurious results with inclusion of the zero variance groups. The Study Hospital's health plan respondents (\underline{n} = 209, \underline{M} = 87.15, \underline{SD} = 6.652) had slightly higher patient satisfaction scores than non-Study Hospital Insurance holders (\underline{n} = 66, \underline{M} = 86.52, \underline{SD} = 9.487). After a determination of equal variances was established through Levene's statistic, \underline{F} = .468 (65, 208), \underline{p} = .494, an independent t test analysis demonstrated no significant difference at the two tailed .05 level in patient satisfaction scores between those with The Study Hospital's insurance and those with other types of health insurance, \underline{t} = .608(273), \underline{p} = .543.

Yearly Net Income

Satisfaction by level of yearly net income was also examined. The highest mean satisfaction scores were reported by those indicating incomes as "Greater than \$100,001" (\underline{n} = 12, \underline{M} = 88.67, \underline{SD} = 2.060), while the lowest mean scores were noted for those reporting annual net incomes of "Less than \$25,000" (\underline{n} =56, \underline{M} =84.89, \underline{SD} =11.535). The

overall mean satisfaction score for the sample was noted to be 86.98 ($n = 273$, $SD = 7.678$). Table 23 reflects group sizes, mean satisfaction scores, and standard deviations by reported net annual income levels.

Table 23
Mean Satisfaction Subscale Scores, Standard Deviations, and Group Sizes by Reported Annual Net Income Level for Respondents of the Nurse Practitioner Satisfaction Survey

Income	\underline{n}^a	Satisfaction Score \underline{M}^b	\underline{SD}
Less than \$25,000	56	84.89	11.535
\$25,001-50,000	133	87.08	7.380
\$50,001-75,000	49	88.06	4.230
\$75,001-100,000	23	88.26	3.769
Greater than \$100,001	12	88.67	2.060
Total ^c	273	86.98	7.678

^aTwenty-seven respondents either failed to indicate an income level or failed to provide data sufficient for calculation of a patient satisfaction score.

^bMean values based on the 5 point Likert-type response scale 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree.

^cReported as overall mean and standard deviation

The lack of determination of homogeneity of variance among the various income groupings through Levene's test, $F = 3.553(4, 268)$, $p = .008$, resulted in the subsequent calculation of the Welch test, $1.804(4, 72.080)$, $p = .137$, which demonstrated no statistically significant differences in patient satisfaction with nurse practitioner delivered primary health care services among income groups as reported by the respondents after accounting for unequal variances among the groups.

Patient Type

Groupings of the variable “Patient type” were also examined for differences in reported mean satisfaction scores. The Study Hospital’s employees had the highest reported patient satisfaction scores ($\underline{n} = 238$, $\underline{M} = 87.01$, $\underline{SD} = 6.950$), while contract employees reported the lowest scores ($\underline{n} = 5$, $\underline{M} = 85.80$, $\underline{SD} = 6.573$). Sample sizes, mean satisfaction scores, and standard deviations for the three patient type categories are illustrated in Table 24.

Table 24
Group Sizes, Satisfaction Subscale Scores, and Standard Deviations for Reported Patient Types of Repondents of the Nurse Practitioner Satisfaction Survey

Patient Type	\underline{n}^a	Satisfaction Score \underline{M}^b	\underline{SD}
Study Hospital Employee	238	87.01	6.950
Family Member of Employee	43	86.02	11.107
Contract Employee	5	85.80	6.573
Total ^c	286	86.84	7.688

^aSatisfaction scores calculated for those respondents indicating a patient type and providing data sufficient for score computation. Fourteen respondents provided insufficient data on the survey.

^bMean values based on the 5 point Likert-type type response scale 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree.

^cReported as overall mean and standard deviation

Levene’s test indicated the presence of equal group variances, $F = .562(2, 283)$, $p = .571$. Although the mean satisfaction scores varied between the three patient type groups, no statistically significant differences were demonstrated through calculation of the Oneway ANOVA as depicted in Table 25, $F = .347(2, 283)$, $p = .707$.

Table 25

Analysis of Variance Illustrating Differences in Patient Satisfaction Subscale Scores between Patient Type Groups for Respondents of the Nurse Practitioner Satisfaction Survey

	SS	df	MS	F ^a	p ^b
Groups	41.181	2	20.590	.347	.707
Within Groups	16802.739	283	59.374		
Total	16843.920	285			

^aOne Way Analysis of Variance

^b.05 Alpha Level for the 2 Tailed Test of Significance

Employment Status

Differences in general patient satisfaction subscale scores were further examined by employment status reported by the respondents. Table 26 illustrates the sample sizes, mean calculated general satisfaction subscale scores, and standard deviations for employment status types as reported by the respondents. The highest mean satisfaction score were noted for the “PRN” employee group ($\underline{n} = 21$, $\underline{M} = 88.33$, $\underline{SD} = 2.708$), while the lowest were noted for the “Part time” employee group ($\underline{n} = 21$, $\underline{M} = 85.64$, $\underline{SD} = 4.509$).

Table 26

Group Sizes, Mean Satisfaction Subscale Scores, and Standard Deviations by Employment Status for Respondents of the Nurse Practitioner Satisfaction Survey

	\underline{n}^a	Satisfaction Score \underline{M}^b	\underline{SD}
PRN	21	88.33	2.708
Unemployed	7	87.57	3.599

(Table continued)

Full Time	210	86.90	7.246
Contract	3	85.67	4.509
Part Time	39	85.64	4.509
<hr/>			
Total	280	86.83	7.749

^aSatisfaction scores calculated for those respondents indicating an employment type and providing data sufficient for score computation. Twenty respondents provided insufficient data on the survey.

^bMean values based on the 5 point Likert-type type response scale 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree.

^cReported as overall mean and standard deviation

Levene's Test of Homogeneity of Variance indicated the existence of equal variances between the employment type groups, $F = 1.051(4, 275)$, $p = .381$. An Oneway Analysis of Variance comparison ensued and revealed that although mean satisfaction scores differed by employment type, none of the demonstrated differences were statistically significant, $F = .460(4, 275)$, $p = .765$. Table 27 illustrates reported differences in patient satisfaction scores between various employment types.

Table 27

Analysis of Variance of Overall Means of General Patient Satisfaction Scores between Patient Employment Status Groups for Respondents of the Nurse Practitioner Satisfaction Survey

	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u> ^a	<u>p</u> ^b
Between Groups	111.393	4	27.848	.460	.765
Within Groups	16641.717	275	60.515		
<hr/>					
Total	16753.111	279			

^aOne Way Analysis of Variance

^b.05 Alpha Level for the 2 Tailed Test of Significance

Degree of Illness

Subjects were also asked to indicate subjective ratings of the degree of illness currently being experienced. Most respondents indicated their degree of illness as “A little ill” ($n = 124$, $M = 86.22$, $SD = 8.563$), while “Very ill” was reported by the smallest number of respondents ($n = 15$, $M = 87.20$, $SD = 4.379$). Table 28 illustrates group responses, sample sizes, mean satisfaction scores, and standard deviations for each of the subjective response categories.

Table 28
Group Sizes, Mean Satisfaction Subscale Scores, and Standard Deviations by Subjective Report of Degree of Illness Currently Experienced for Respondents of the Nurse Practitioner Satisfaction Survey

Degree of Illness	Satisfaction Score		
	n^a	M^b	SD
Very Ill	15	87.20	4.379
Moderately Ill	88	88.00	4.105
A Little Ill	124	86.22	8.563
Not Ill	53	86.20	10.749
Total ^c	280	86.83	7.749

^aSatisfaction scores calculated for those respondents indicating a subjective degree of current illness and providing data sufficient for score computation. Twenty respondents provided insufficient data on the survey.

^bMean values based on the 5 point Likert-type type response scale 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree.

^cReported as overall mean and standard deviation

Statistical determination of Levene's Test of Homogeneity of Variance demonstrated equal variances among the subjective report of degree of illness groups, $F=2.358(3, 276)$, $p = .072$. Oneway Analysis of Variance comparison of group means ensued and demonstrated no statistically significant differences in satisfaction scores by degree of reported illness, $F = 1.046(3, 276)$, $p = .373$. Oneway ANOVA results demonstrating no group differences are illustrated in Table 29.

Table 29

Analysis of Variance of Overall Means of General Patient Satisfaction Subscale Scores between Degrees of Reported Illness by Respondents of the Nurse Practitioner Satisfaction Survey

	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u> ^a	<u>p</u> ^b
Between Groups	188.316	3	62.772	1.046	.373
Within Groups	16564.794	276	60.017		
Total	16753.111	279			

^aOne Way Analysis of Variance

^b.05 Alpha Level for the 2 Tailed Test of Significance

Degree of Injury

Additionally, subjects were asked to indicate their current degree of injury in order to determine the existence of differences in patient satisfaction scores. The majority of subjects reported being "Not injured," ($n = 248$, $M = 86.74$, $SD = 8.073$), 15 reported being "A little injured" ($M=87.87$, $SD=4.549$), while no subject indicated "Very injured" as a response. Mean scores, standard deviations, and group sizes by report of degree of injury are illustrated in Table 30.

Table 30
Group Sizes, Mean Satisfaction Subscale Scores, and Standard Deviations by Subjective Report of Degree of Injury Currently Experienced by Nurse Practitioner Satisfaction Survey Respondents

Degree of Injury	Satisfaction Score		
	<u>n</u> ^a	<u>M</u> ^b	<u>SD</u>
Very Injured	0		
Moderately Injured	14	87.93	2.615
A Little Injured	15	87.87	4.549
Not Injured	248	86.74	8.073
Total ^c	277	88.86	7.349

^aSatisfaction scores calculated for those respondents indicating a subjective degree of current injury and providing data sufficient for score computation. Twenty-three respondents provided insufficient data on the survey.

^bMean values based on the 5 point Likert-type type response scale 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree.

^cReported as overall mean and standard deviation

Levene's Test of Homogeneity of Variance demonstrated equal variances among the subjective report of injury groups, $F = 1.018(2, 274)$, $p = .363$. Oneway Analysis of Variance comparison of group means demonstrated no statistically significant differences in satisfaction scores by degree of reported injury, $F = .288(2, 274)$, $p = .750$. Oneway ANOVA results demonstrating no statistically significant group differences are illustrated in Table 31.

Table 31
Analysis of Variance of Overall Means of General Patient Satisfaction Subscale Scores
between Degrees of Reported Injury by Respondents of the Nurse Practitioner
Satisfaction Survey

	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u> ^a	<u>p</u> ^b
Between Groups	36.641	2	17.321	.288	.750
Within Groups	16478.146	274	60.039		
Total	16512.787	276			

^aOne Way Analysis of Variance

^b.05 Alpha Level for the 2 Tailed Test of Significance

Objective Four

Objective four was to determine if a model existed which explains a significant portion of the variance in patient satisfaction as measured by the Nurse Practitioner Patient Satisfaction Survey from subscales/latent factors and associated variables that emerged statistically following factor analysis of the dataset, and the demographic characteristics of gender, age, income, and highest educational level completed. The first construct identified by factor analysis consisted of 18 variables, was labeled “general satisfaction,” and was utilized as the dependent variable in the first regression equation. Construct two consisted of six primary variables and was labeled “communication” and was used as the dependent variable in the second regression equation. The third identified construct consisted of four variables, was labeled “scheduling,” and was used as the dependent variable in the third regression equation.

Data analysis consisted of Pearson's product moment correlations and stepwise multiple regression analysis where the probability of F to enter the equation was set at .05, and the probability of F to be removed from the model was set at .10. Data for each equation was analyzed for collinearity, normality, linearity, and homogeneity. Multiple regression diagnostics including outlier and influential data point identification were also computed and analyzed. Assumptions of error distribution and independence of residuals were additionally made.

General Satisfaction Subscale Score Regression Equation

For the first equation utilizing "general satisfaction" as the dependent variable, standardized residual values were noted to be somewhat aberrant and exceeding the +/- 2.0 level for cases 155 and 47 with values of -10.63348 and -10.48098 respectively. As depicted in Figure 2, standardized residuals were nonetheless subsequently plotted to reveal an approximation of a normal curve and assumption of normality.

The assumption of homoscedasticity was tested for the first equation using satisfaction score as the dependent variable. When plotted against the dependent variable satisfaction scores, standardized residual values appeared to lack a random scattering about zero, representing somewhat of a linear relationship and the presence of two potential outliers. As the intent of the study was to capture the assorted perceptions of the varied patient types presenting for nurse practitioner delivered health care in the occupational setting, amid the possibility of at least two outlier cases in the analysis, all were included in the analyses. The assumption of homoscedasticity was determined to be minimally assumed due to overall high levels of patient satisfaction demonstrated by the dataset, and no cases were deleted.

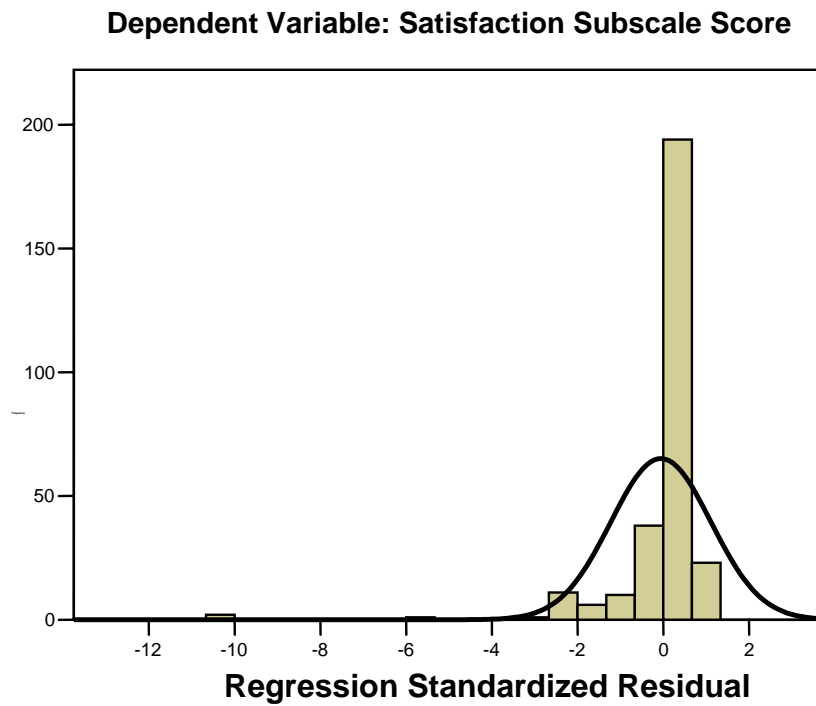


Figure 2
Histogram Depicting Standardized Residuals for the Dependent Variable Satisfaction Subscale Scores

Further diagnostics corroborated the decision to allow all cases to remain in the dataset for patient satisfaction score analysis. Satisfaction score data were analyzed for influential points through analysis of Cook's D and calculation of the leverage statistic, \underline{h} . No subjects exceeded the Cook's D maximum parameter of 1.0. Leverage (\underline{h}) maximum cutoff was determined to be .0394 through calculation of the following formula: $\underline{h} > 2(k+1)/\underline{n}$, where \underline{k} represented the number of independent variables (4) and \underline{n} represented the sample size of 254. No cases were noted to exceed the .0394 parameter, and the absence of influential data points was assumed. Additionally, no cases were determined to be large in relation to the others.

Computation of the regression equation for prediction of patient satisfaction scores ensued with inclusion of the full dataset without case deletions. Due to the categorical nature of the demographic variables "Gender," "Age," "Income," and "Highest educational level achieved," dummy coding was utilized for multiple regression analysis. Various levels of the variables were recoded to represent membership or exclusion within the groups to allow for facilitated multiple regression analysis using categorical data.

Initial bivariate Pearson's product moment correlation computations of the dummy coded independent variables age, income, educational level, and gender with the dependent variable general patient satisfaction were preliminarily performed. The lowest values calculated for the relationship between the coded independent variables and the dependent variable general satisfaction scores were analyzed and the lowest correlation for each independent variable category removed from further regression equation computation.

Table 32 reflects Pearson's product moment bivariate correlations and significance levels of each dummy coded level of the independent variables age, income, educational level, and gender with the dependent variable general patient satisfaction. Calculated bivariate correlations were analyzed according to Davis's (1971) descriptors of association (.00-.09 = negligible, .10-.29 = low, .30-.49 = moderate, .50-.69 = substantial, .70 and higher = very strong).

The lowest values calculated and subsequently removed from analysis for each dummy coded level of each of the independent variable categories, "Age 26-35" ($\underline{n} = 271$, $\underline{r} = -.038$, $\underline{p} = .534$), "Income \$25,001-50,000" ($\underline{n} = 273$, $\underline{r} = .013$, $\underline{p} = .827$), and "Doctoral Degree" ($\underline{n} = 286$, $\underline{r} = -.026$, $\underline{p} = .665$) are presented in boldface print in Table 32. Correlation significance levels were formulated and analyzed at the .05 alpha level for the 2-tailed test of significance.

Table 32
Sample Size, Pearson's Product Moment Bivariate Correlations and Significance Levels Representing the Relationship between Each Dummy Coded Level of the Independent Variables Age, Income, Educational Level, and Gender and the Dependent Variable Patient Satisfaction Subscale Scores

Variable	<u>N</u>	<u>r</u> ^a	<u>p</u> ^b
Gender	284	.036	.549
Age 18-25	271	-.182	.003
Age 26-35	271	-.038	.534
Age 36-45	271	.077	.205
Age 46-55	271	.066	.280
Age 56 and Older	271	.066	.280

(Table continued)

Income less than \$25,000	273	-.138	.022
Income \$25,001-50,000	273	.013	.827
Income \$50,001-75,000	273	.066	.276
Income \$75,001-100,000	273	.051	.403
Income greater than \$100,001	273	.047	.437
Less than High School	286	-.029	.621
High School/GED	286	.029	.621
Some Vocational/Technical	286	.027	.653
Vocational/Technical	286	-.101	.088
Some College	286	-.089	.132
Associate Degree	286	.053	.376
Bachelors Degree	286	.042	.476
Masters Degree	286	.061	.302
Doctoral Degree	286	-.026	.665

^aPearson's Product Moment Correlation

^bTwo Tailed Alpha .05

Remaining independent variables were entered stepwise into the regression equation with patient satisfaction entered as the dependent variable. A single variable, educational level "Some College" was retained in the equation and was determined to explain approximately 2% of the variance in calculated patient satisfaction scores ($R^2 = .021$). As illustrated in Table 33, Oneway Analysis of Variance (ANOVA) analysis revealed that the regression equation with the single educational level predictor "Some College" was

significant in predicting patient satisfaction with nurse practitioner delivered primary health care services in the occupational setting, $F = 5.364(1, 252)$, $p = .021$.

Table 33
Significance of the Regression Equation Employing Educational Level “Some College” in Predicting Patient Satisfaction with Nurse Practitioner Delivered Health Care

	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u> ^a	<u>p</u> ^b
Between Groups	1	230.654	230.654	5.364	.021
Within Groups	252	10835.504	42.998		
Total	253	11066.157			

^aOne Way Analysis of Variance

^b.05 Alpha Level for the 2 Tailed Test of Significance

Coefficients retained in the regression equation included an intercept of 87.727 ($S_b = .471$) and a coefficient of -2.243 if a member of the educational level group “Some College.” Being a member of the group “Some College” resulted in a regression equation of $\hat{y} = 87.727 - 2.243(1)$ or $\hat{y} = 87.727 - 2.243$, while not being a member of this group resulted in a higher general satisfaction score as demonstrated by the regression equation $\hat{y} = 87.727 - 2.243(0)$ or $\hat{y} = 87.727 - 0$. Table 34 illustrates standardized and unstandardized regression coefficients with corresponding t values and significance levels for the general satisfaction equation. General satisfaction scores for subjects reporting having attended some college were -2.243 points lower than that reported for all other educational levels.

Table 34

Coefficient Values, Standard Errors, Standardized Coefficient Values, T Values and Significance Levels for Dummy Coded Independent Variables Retained in the Regression Equation Predicting Patient Satisfaction Subscale Scores

	Coefficient	<u>S_b</u>	Beta	<u>t</u>	p ^a
Intercept	87.727	.471		186.341	<.001
Educational Level “Some College”	-2.243	.969	-.144	-2.316	.021

^a.05 Alpha Level for the 2 Tailed Test of Significance

DFBETA computations were performed to analyze potential effects and modifications to the regression line and coefficients with deletions of certain cases from analysis. DFBO and Standardized DFBO values, reflecting changes to the intercept, as well as DFBETA and Standardized DFBETA values for the variable “Some College,” determined to be the significant variable predicting patient satisfaction subscores in the equation were calculated. Standardized DFBETA values were compared to the threshold value of .1882 to aid in the detection of possible outliers and influential cases. The threshold value was computed using the following formula: $3/\sqrt{n}$, where n = the sample size of 254.

Table 35 reflects DFBETA and Standardized DFBETA values for the regression line intercept and significant predictor variable, “Some College.” As the intent of the study was to determine satisfaction levels and obtain realistic and comprehensive perspectives and perceptions of all patients presenting for nurse practitioner care in the occupational setting, no cases were deleted.

Table 35
 DFBETA and Standardized DFBETA Values for the Satisfaction Subscale Score
 Regression Equation Intercept and Educational Level Predictor Variable “Some College”

Subject	DFBO	SDFBO	DFB“Some College”	SDFB”Some College”
40	.00000	.00000	-.63531	-.70253
300	.00000	.00000	-.33023	-.34647
218	.00000	.00000	-.29633	-.30979
62	.00000	.00000	-.22853	-.23749
104	.00000	.00000	-.22853	-.23749
155	-.35610	-1.00712	.35610	.50238
47	-.36127	-1.03364	.50238	.48949

^aCompared to threshold value of .1882

All remaining dummy coded levels of the independent variables age, income, educational level, and gender were determined not to contribute significantly to the regression equation and were subsequently deleted from computation utilizing the probability of F to enter of .05, and the probability of F to be removed from the model of .10. The deleted variable with the highest VIF value and lowest TOL value was “Bachelor’s Degree” with values of 1.166 and .858 respectively. The variable “Income greater than \$100.001” was noted to have the lowest VIF and highest TOL values of the dataset with 1.001 and .999 respectively. Deleted variables, standardized betas, t values, corresponding significance levels, partial correlations and tolerance levels are presented in Table 36.

Table 36

Excluded Variables, Standardized Coefficients, T Values, Significance Levels, Partial Correlations, and Tolerance Levels for the Regression Equation Predicting Patient Satisfaction Subscale Scores

Variable	Beta In	t	p ^a	Partial Correlation	Tolerance	VIF
Gender	.004	.065	.948	.004	.992	1.008
Age 18-25	-.103	-1.624	.106	-.102	.968	1.033
Age 36-45	.084	1.342	.181	.084	.997	1.003
Age 46-55	.039	.626	.532	.039	.993	1.008
Age 56 and Older	.054	.864	.388	.054	.992	1.008
Income less than \$25,000	-.037	-.576	.565	-.036	.924	1.083
Income \$50,001–75,000	.044	.698	.486	.044	.979	1.002
Income \$75,001–100,000	.027	.426	.671	.027	.991	1.009
Income greater than \$100,001	.045	.728	.467	.046	.999	1.001
Less than High School	-.071	-1.134	.258	-.071	.998	1.002
High School or GED	.047	.728	.468	.046	.944	1.059
Some Vocational or Technical	.003	.047	.962	.003	.986	1.014

(Table continued)

Vocational or Technical	.024	.374	.709	.024	.983	1.017
Associate Degree	.008	.127	.899	.008	.959	1.043
Bachelors Degree	-.063	-.937	.350	-.059	.858	1.166
Masters Degree	.046	.721	.471	.045	.978	1.023

^a.05 Alpha Level for the 2 Tailed Test of Significance

Calculation of the general satisfaction regression equation with outlier cases 155 and 47 deleted resulted in no change in the coefficient values in the prediction equation of the general patient satisfaction score. “Some college” continued to be the only significant predictor variable when the regression line was calculated both with and without the two outliers.

Communication Subscale Score Regression Equation

The second regression equation was constructed using the subscale “communication score” as the dependent variable. The dummy coded variables, gender, age, income, and highest educational level attained were entered into the communication subscale regression equation in a stepwise fashion as predictor or independent variables.

As depicted in Figure 3, the graphic histogram illustration of the plotted standardized residuals for the dependent variable, communication subscale scores, revealed an approximation of a normal curve and the subsequent minimal assumption of normality.

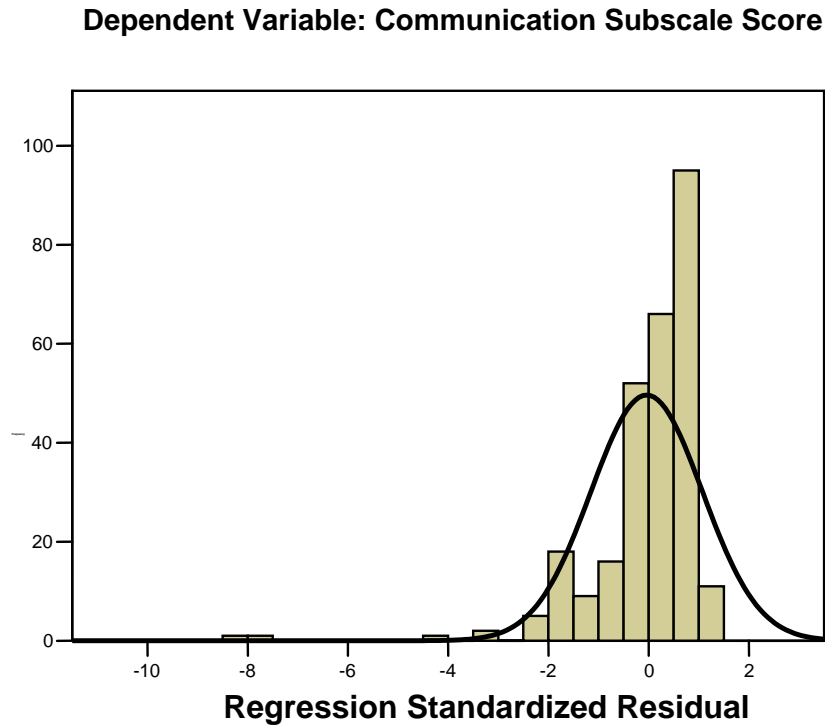


Figure 3
Histogram Depicting Standardized Residuals for the Dependent Variable Communication Subscale Scores

The assumption of homoscedasticity for the second equation was tested through visual inspection of the scatterplot of standardized residuals plotted against computed communication scores. When plotted against the dependent variable communication scores, standardized residual values appeared to be scattered about zero in somewhat of a linear fashion, suggesting minimal homoscedasticity. The presence of two potential outliers, cases 155 and 47, with standardized residual values of -8.31339 and -7.91877 respectively was additionally noted. As previously stated a decision was made to delete

none of the cases from further analysis in an attempt to present a realistic depiction of all patients presenting for care in the occupational setting.

Communication score data were further analyzed for influential points using Cook's D and the leverage statistic (\underline{h}). Further analysis and diagnostics corroborated the decision to delete no cases from analysis, as no values were determined to exceed the calculated \underline{h} threshold value of .0382, and no calculated Cook's D values were noted to exceed the 1.0 cutoff. No excessive pull or leverage was determined to be exerted on the regression estimates as a result of any case in computation of the communication score regression equation.

Prior to computation of the regression equation using the communication score as the dependent variable, all dummy coded independent variables were examined for their relationship with the calculated communication score. Bivariate correlations utilizing Pearson's product moment correlations at the 2 tailed, alpha .05 level were calculated. Correlations were analyzed according to Davis's (1971) descriptors of association (.00-.09 = negligible, .10-.29 = low, .30-.49 = moderate, .50-.69 = substantial, .70 and higher = very strong).

Age group "46-55 years" (\underline{n} = 278, \underline{r} = .026, \underline{p} = .670), income level "\$25,001-50,000" (\underline{n} = 278, \underline{r} = .011, \underline{p} = .852), and education level "Less than High School" (\underline{n} = 282, \underline{r} = .007, \underline{p} = .910) were subsequently eliminated from the multiple regression analysis due to their low correlations with the dependent variable, communication score. Table 37 reflects Pearson's product moment correlations and significance levels of each dummy coded independent variable with the dependent variable communication score, with the lowest values eliminated in boldface print.

Table 37
Sample Size, Pearson's Product Moment Correlations, and Significance Levels
Representing the Relationship between all Dummy Coded Independent Variables with
the Dependent Variable Communication Subscale Score

Variable	<u>n</u>	<u>r</u> ^a	<u>p</u> ^b
Gender	292	.065	.266
Age 18-25	278	-.226	<.001
Age 26-35	278	.059	.323
Age 36-45	278	.027	.656
Age 46-55	278	.026	.670
Age 56 and Older	278	.099	.100
Income less than \$25,000	282	-.169	.004
Income \$25,001-50,000	282	.011	.852
Income \$50,001-75,000	282	.101	.089
Income \$75,001-100,000	282	.047	.434
Income greater than \$100,001	282	.058	.333
Less than High School	294	.007	.910
High School/GED	294	-.035	.547
Some Vocational/Technical	294	-.011	.857
Vocational/Technical	294	-.115	.049
Some College	294	-.076	.194
Associate Degree	294	.073	.213
Bachelors Degree	294	.051	.382

(Table continued)

Masters Degree	294	.136	.020
Doctoral Degree	294	-.062	.289

^aPearson's Product Moment Correlation

^bTwo Tailed Alpha .05

Remaining dummy coded independent variables were entered stepwise into the regression equation with communication scores entered as the dependent variable. Two variables, age group "18-25," ($R^2 = .026$), F Change=6.844(1, 260), $p = .009$, and educational level "Masters Degree," ($R^2 = .017$), F Change=4.717(1, 259), $p = .003$ were retained in the equation to account collectively for approximately 4.3% of the variance in communication scores.

Oneway Analysis of Variance results as illustrated in Table 38 revealed that the equation with the predictors age "18-25," $F = 6.844(1, 260)$, $p = .009$ and educational level "Masters Degree," $F = 5.829(2, 259)$, $p = .003$, was significant in predicting satisfaction with communication aspects of the nurse practitioner and patient interaction.

Table 38
Significance of Age Group 18-25 and Masters Educational Level in Predicting Satisfaction with Communication Aspects of the Patient and Nurse Practitioner Interaction

Predictors		<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u> ^a	<u>p</u> ^b
Age 18-25	Between Groups	1	44.578	44.578	6.844	.009
	Within Groups	260	1693.453	6.513		
	Total	261				

(Table continued)

Masters Level Education	Between Groups	2	74.868	37.434	5.829	.003
	Within Groups	259	1663.163	6.421		
	Total	261	1738.031			

^aOneway Analysis of Variance

^b.05 Alpha Level for the 2 Tailed Test of Significance

Coefficients retained in the final regression equation included an intercept of 28.260 ($S_b=.173$) and a coefficient of -1.194 ($S_b=.494$) if a member of the 18-25 year old age group. Additionally, if a member of the masters education level group, a coefficient of 1.387 ($S_b=.638$) was added to the equation, while if not a member of the masters education group, a 0 was added. Being a member of the 18-25 year old age group resulted in a decrease in communication satisfaction scores of -1.194, while being a member of the masters level educational group resulted in an increase in scores of 1.387.

Table 39 illustrates standardized and unstandardized regression coefficients with corresponding t values and significance levels calculated at the .05 alpha for the 2 tailed test of significance for the final communication score equation with two significant predictor variables.

Table 39

Coefficient Values, Standard Errors, Standardized Coefficient Values, T Values and Associated Significance Levels, R2 Change and Corresponding F Value Changes, and Significance Levels for Independent Variables Determined to be Statistically Significant in Predicting Satisfaction with Nurse Practitioner Communication

	Coefficient	S_b	Beta	t	p^a	R2 Δ	F Δ	df	F Δp^a
Intercept	28.260	.173	-.160	63.524	<.001				
Age 18-25	-1.194	.494	-.148	-2.417	.016	.026	6.844	260	.009

(Table continued)

Masters									
Education	1.387	.638	.133	2.172	.031	.017	4.717	259	.003

^a.05 Alpha Level for the 2 Tailed Test of Significance

DFBETA computations were additionally performed to analyze potential effects and modifications to the regression line and coefficients with deletion of certain cases from analysis. DFBO and Standardized DFBO values, reflecting changes to the intercept, as well as DFBETA and Standardized DFBETA values for the variables “Age 18-25” and “Masters Education” determined to be significant in predicting communication satisfaction are presented in Table 40. Deletion of case 155 was demonstrated to potentially result in a change of -.72564 to the coefficient representing age group 18-25, while deletion of case 47 would have potentially resulted in a change of -.69195 to the coefficient representing age group 18-25. Standardized DFBETA values were compared to the computed threshold value of .1853 ($n = 262$), no variables exceeded the threshold and none were subsequently removed from the dataset or analysis, allowing the regression equation to remain as computed.

Table 40
DFBETA and Standardized DFBETA Values for the Communication Subscale Score Regression Equation Intercept and Predictor Variables Age 18-25 and Masters Level Education

Subject	DFBO	SDFBO	DFB 18-25	SDFB18-25 ^a	DFB MS	SDFB MS ^b
155	.00000	.00000	-.72564	-1.72312	.00000	.00000
47	.00000	.00000	-.69195	-1.61517	.00000	.00000

^aCompared to the threshold value of .1853

^bCompared to the threshold value of .1853

Variables excluded from the final regression equation formulated to predict satisfaction with communication aspects of nurse practitioner delivered primary health care services, standardized beta values, *t* values with corresponding significance levels at the .05 alpha level for the 2 tailed test, partial correlations, and tolerance levels were all determined to be acceptable and are presented in Table 41. Of the deleted variables “Income less than \$25,000” was noted to have the highest VIF value and subsequently the lowest TOL value, 1.176 and .850 respectively. The variable “Some Vocational or Technical School” was noted to have the lowest VIF and highest TOL values of the dataset, 1.010 and .990 respectively.

Table 41
Excluded Variables, Standardized Coefficients, T Values, Significance Levels, Partial Correlations, Tolerance Levels, and Variance Inflation Factors for the Final Regression Equation Predicting Satisfaction with Communication with the Nurse Practitioner

Variable	Beta In	<i>t</i>	<i>p</i> ^a	Partial Correlation	Tolerance	VIF
Age 25-36	.009	.136	.892	.008	.938	1.066
Age 36-45	-.029	-.466	.642	-.029	.956	1.046
Age 56 and older	.075	1.225	.222	.076	.981	1.020
Income less than \$25,000	-.037	-.560	.576	-.035	.850	1.176
Income \$50,001 -75,000	.084	1.370	.172	.085	.989	1.011
Income \$75,001 -100,000	-.022	-.034	.973	-.002	.981	1.019

(Table continued)

Income greater than \$100,001	.002	.039	.969	.002	.940	1.064
High School or GED	.018	.292	.770	.018	.979	1.021
Some Vocational or Technical	-.021	-.349	.727	-.022	.990	1.010
Vocational or Technical	-.037	-.607	.544	-.038	.989	1.012
Some College	-.055	-.889	.375	-.055	.957	1.045
Associate Degree	.070	1.142	.255	.071	.989	1.011
Bachelors Degree	.026	.420	.675	.026	.969	1.032
Doctoral Degree	-.077	-1.269	.206	-.079	.988	1.002
Gender	.057	.944	.346	.059	.997	1.003

^a.05 Alpha Level for the 2 Tailed Test of Significance

Calculation of the communication score regression equation with outlier cases 155 and 47 deleted resulted in a regression equation with “Masters level education” demonstrating a coefficient of 1.446 ($t = 2.621$, $p = .009$) and existing as the single predictor variable in the equation, $\hat{y} = 28.201 + 1.446$. Although “Age group 18-25” was identified as a predictor in the equation calculated with no cases or outliers deleted, the variable was not determined to be a significant predictor communication satisfaction scores when calculated with cases 155 and 47 deleted from the dataset.

Scheduling Subscale Score Regression Equation

Data from the third regression equation utilizing the scheduling score as the dependent variable were additionally inspected. Figure 4 depicts the spread of standardized residuals for the scheduling score. An approximation of normality was concluded.

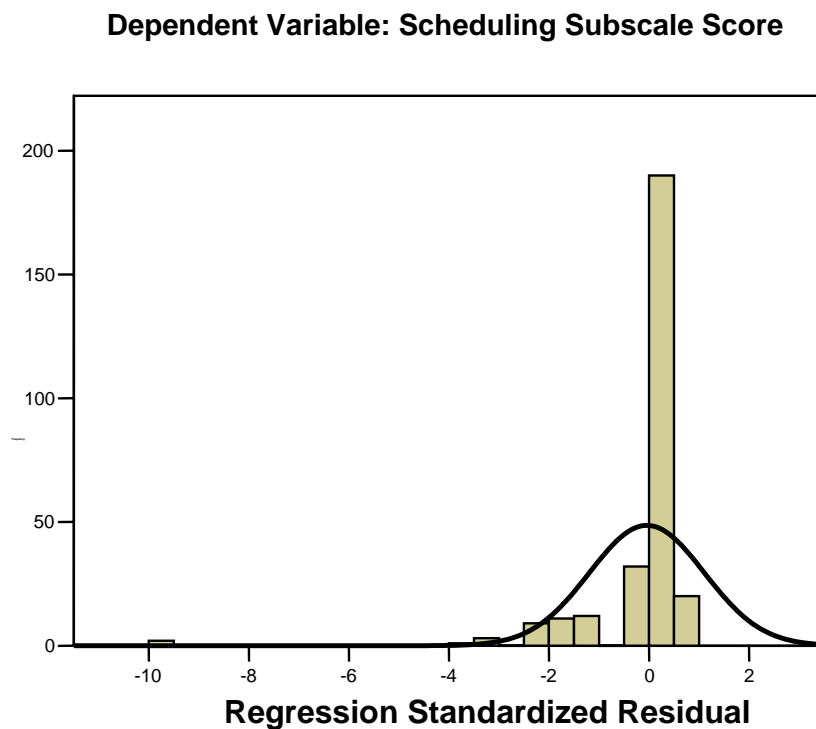


Figure 4
Histogram Depicting Standardized Residuals for the Dependent Variable Scheduling Subscale Scores

When plotted against the dependent variable scheduling scores, standardized residual values appeared to approximate a random linear scattering about zero with the presence of the two potential outliers sharing the same standardized residual value of -9.6232. The

assumption of homoscedasticity was determined to minimally exist. Again, the decision to not delete any of the cases was made by the researcher.

Influential point analysis using Cook's D demonstrated the presence of two suspected outlier cases exceeding the cutoff value of 1.0. A Cook's D of 1.0312 was noted for case 155, with case 47 demonstrating a Cook's D value of 1.64133. No leverage values in excess of the calculated .0382 maximum were detected following inspection of the data. Combined with the desire and intent of the researcher to gain a holistic and all encompassing perception of nurse practitioner delivered primary care in the occupation setting, all cases were retained in the analysis for prediction of satisfaction with the scheduling process in the clinic.

Computation of the regression equation for the prediction of patient satisfaction with the appointment scheduling process of the nurse practitioner visit ensued with inclusion of the full dataset without case deletions. Bivariate correlations of each of the independent variables with the dependent variable scheduling satisfaction score was initially performed through calculation of a Pearson's product moment correlation. Table 42 reflects Pearson's product moment correlations and significance levels for all variables entered into the equation as possible predictors of satisfaction with nurse practitioner appointment scheduling. Correlations were analyzed according to Davis's (1971) descriptors of association (.00-.09 = negligible, .10-.29 = low, .30-.49 = moderate, .50-.69 = substantial, .70 and higher = very strong).

The lowest values calculated and subsequently removed from the analysis are represented in boldface print and include the age group "36-45" ($r=.022$, $p=.716$), income level "Greater than \$100.001" ($r=.015$, $p=.805$), and education level "Some College"

($r = -.012$, $p = .842$). A two-tailed alpha level of .05 was utilized in determining significance of the relationships.

Table 42
Sample Size, Pearson's Product Moment Correlations and Significance Levels
Demonstrating the Relationship between Each Dummy Coded Level of the Independent
Variables Age, Income, Educational Level, and Gender with the Dependent Variable
Patient Satisfaction With Scheduling

Variable	<u>N</u> ^a	<u>r</u>	<u>p</u> ^b
Gender	293	.460	.043
Age 18-25	280	-.239	<.001
Age 26-35	280	.044	.464
Age 36-45	280	.022	.716
Age 46-55	280	.085	.158
Age 56 and Older	280	.057	.344
Income less than \$25,000	282	-.103	.084
Income \$25,001-50,000	282	.029	.625
Income \$50,001-75,000	282	.017	.779
Income \$75,001-100,000	282	.067	.261
Income greater than \$100,001	282	.015	.805
Less than High School	295	-.038	.513
High School/GED	295	.071	.225
Some Vocational/Technical	295	-.040	.496
Vocational Technical Degree	295	-.072	.215
Some College	295	-.012	.842

(Table continued)

Associate Degree	295	-.032	.585
Bachelors Degree	295	.044	.452
Masters Degree	295	.026	.655
Doctoral Degree	295	-.087	.138

^aPearson's Product Moment Correlation

^bTwo Tailed Alpha .05

Remaining independent variables were entered stepwise into the regression equation with scheduling satisfaction entered as the dependent variable. A single variable, age group "18-25 years" was retained in the equation and was determined to explain approximately 4% of the variance in scheduling satisfaction scores ($R^2=.041$). As illustrated in Table 43, Oneway Analysis of Variance (ANOVA) results revealed that the regression equation with the single age predictor variable "18-25 years" was significant in predicting satisfaction with process of scheduling nurse practitioner appointments in the occupational setting, $F=11.195(1, 260)$, $p=.001$.

Table 43

Significance of the Regression Equation Employing Age Group 18-25 in Predicting Satisfaction with Scheduling Appointments for Nurse Practitioner Health Care Visits

	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u> ^a	<u>p</u> ^b
Between Groups	24.864	1	24.864	11.195	.001
Within Groups	577.426	260	2.221		
Total	602.290	261			

^aOne Way Analysis of Variance

^b.05 Alpha Level for the 2 Tailed Test of Significance

The single coefficient age group “18-25” was retained in the regression equation. Being a member of the 18-25 year old age group resulted in a regression equation of $\hat{y}=19.502-.954$, while not being a member of the 18-25 year old age group resulted in a higher predicted scheduling satisfaction score of $\hat{y} = 19.502-.954(0)$ or 19.502. Table 44 illustrates standardized and unstandardized regression coefficients with corresponding t values and significance levels for the equation. Scheduling satisfaction scores for subjects reporting their ages as between 18 and 25 years were -.954 points lower than those reporting ages above 18-25 years.

Table 44
Coefficient Values, Standard Errors, Standardized Coefficient Values, T Values and Significance Levels for Dummy Coded Independent Variable Retained in the Regression Equation Predicting Scheduling Satisfaction Scores

	Coefficient	<u>S_b</u>	Beta	<u>t</u>	<u>p^a</u>
Intercept	19.502	.098		198.897	<.001
Age 18-25	-.954	.285	-.203	-3.346	.001

^a.05 Alpha Level for the 2 Tailed Test of Significance

DFBETA calculations were additionally performed to examine possible effects on the scheduling satisfaction score with deletion of certain variables suspected of exerting unusual influence on the regression line. DFBO and Standardized DFBO values, as well as DFBETA and Standardized DFBETA values for the significant variable age group 18-25 years were calculated. Standardized DFBETA values were compared to the threshold value of .1853 for determination of possible outlier cases. As depicted in Table 45, cases 47 and 155 were suspected as outliers in the dataset. No cases were omitted from

analysis in order to obtain a comprehensive perspective of nurse practitioner patient populations in the occupational setting.

Table 45

DFBETA and Standardized DFBETA Values for the Scheduling Score Regression Equation Intercept and Predictor Variable Age 18-25

Subject	DFBO	SDFBO	DFB 18-25	SDFB18-25 ^a
47	.00000	.00000	-4.8495	-2.15429
155	.00000	.00000	-4.8445	-2.15141

^aCompared to the threshold value of .1853

All remaining variables were determined not to significantly contribute to the regression equation and the variance in the scheduling satisfaction score and were subsequently removed from analysis. The deleted variable “Income less than \$25,000” was noted to have the highest VIF value, 1.175, and the lowest TOL value, .851. Gender had the lowest VIF and highest TOL values of 1.001 and .999 respectively. Table 46 illustrates all dummy coded deleted variables, standardized beta levels, *t* values with corresponding significance levels, partial correlations, and tolerance levels.

Table 46

Excluded Variables, Standardized Coefficients, T Values with Corresponding Significance Levels, Partial Correlations, Tolerance Levels, and Variance Inflation Factors for the Regression Equation Predicting Satisfaction with Scheduling

Variable	Beta In	<i>t</i>	<i>p</i> ^a	Partial Correlation	Tolerance	VIF
Gender	.039	.646	.519	.040	.999	1.001
Age 26-45	-.024	-.383	.702	-.024	.937	1.068
Age 46-55	.042	.683	.495	.042	.958	1.043

(Table continued)

Age 56 and older	.034	.555	.579	.034	.990	1.011
Income less than \$25,000	.021	.323	.747	.020	.851	1.175
Income \$25,001-50,000	-.045	-.727	.468	-.045	.971	1.029
Income \$50,001-75,000	.015	.244	.807	.015	.994	1.006
Income \$75,001-100,000	.038	.620	.536	.039	.989	1.001
Less than High School	-.034	-.537	.592	-.033	.943	1.061
High School or GED	.074	1.208	.228	.075	.992	1.008
Some vocational technical	-.032	-.522	.602	-.032	.994	1.006
Vocational Technical Degree	.052	.856	.393	.053	.993	1.007
Associate Degree	-.032	-.532	.595	-.033	.999	1.001
Bachelors Degree	.007	.123	.903	.008	1.000	1.000
Masters Degree	-.006	-.091	.928	-.006	.991	1.009
Doctoral Degree	-.116	-1.918	.056	-.118	.999	1.001

^a.05 Alpha Level for the 2 Tailed Test of Significance

Calculation of regression equation three representing satisfaction with scheduling with outlier cases 155 and 47 deleted from the dataset resulted in a regression equation

with “PhD level education” representing a coefficient of -2.202 ($t = -2.439$, $p = .015$) and “Age group 18-25” representing the coefficient -.486 ($t = -2.148$, $p = .033$) determined to be significant predictors. Although the equation with no deleted cases resulted in “Age group 18-25” existing as the single predictor variable of the scheduling satisfaction score, calculation with outlier cases 155 and 47 deleted resulted in two significant predictors with the additional variable “PhD level education” as coefficient in the equation,

$$\hat{y} = 19.520 - 2.020 - .486.$$

Chapter 5

Summary, Conclusions, and Recommendations

Purpose and Objectives

The purpose of this study was to explore and determine the degree of client satisfaction with utilization of primary healthcare services delivered by a nurse practitioner in the Employee Health Services department of a not for profit hospital in the Southern portion of the United States. The specific research objectives explored in the study were:

1. To describe adult patients of healthcare services delivered by a nurse practitioner (NP) at a not for profit hospital in the Southern portion of the United States on the following demographic characteristics:
 - a. Age
 - b. Gender
 - c. Marital status
 - d. Highest educational level completed
 - e. Race
 - f. Type of health insurance coverage
 - g. Yearly net income
 - h. Employment status
 - i. Patient type
 - j. Subjective patient report of degree of illness and /or injury necessitating desire to seek medical attention
 - k. Current health problems necessitating medication administration

- l. Number of prescription medications routinely taken
 - m. Number of times the patient has seen a nurse practitioner (NP) within the past year
 - n. Number of times the patient has seen a physician's assistant (PA) within the past year
 - o. Number of times the patient has seen a physician (Phy) within the past year
 - p. Number of times in past year the patient has seen the nurse practitioner in Employee Health at a not for profit hospital in the Southern portion of the US
 - q. The healthcare provider type with whom the patient has been most satisfied (NP, PA, Phy)
 - r. The patient perception of the provider type providing the best health education (NP, PA, Phy)
- 2. To determine the patient satisfaction with care delivered by a NP at a not for profit hospital in the Southern portion of the US as measured by the Nurse Practitioner Satisfaction Survey.
 - 3. To determine if differences in perceived patient satisfaction as measured by the Nurse Practitioner Satisfaction Survey exist within the following demographic characteristics:
 - a. Gender,
 - b. Race
 - c. Age

- d. Marital status
 - e. Highest educational level completed
 - f. Type of health insurance coverage
 - g. Yearly net income
 - h. Patient type
 - i. Employment status
 - j. Subjective patient report of degree of illness/injury resulting in desire to seek medical attention.
4. To determine if a model existed which explained a significant portion of the variance of patient satisfaction as measured by the Nurse Practitioner Patient Satisfaction Survey from subscales/latent factors and associated variables that emerge statistically following factor analysis of the dataset, and the demographic characteristics of gender, age, income, and highest educational level completed.

Procedures

Target population for this study was defined as all employees and family members of employees over the age of 18 having onsite occupational access to nurse practitioner primary healthcare services. The accessible population consisted of all fulltime, part time, prn (as needed), and contract employees and family members over the age of 18 years of a not for profit hospital in the Southern portion of the United States who voluntarily presented themselves for nurse practitioner delivered healthcare services at the study clinic during the period that extended from January 3, 2005 through February 17, 2005.

A sample of 300 clients from this representative population was selected for participation in the study. The sample size was determined using Cochran's (1977) sample size determination formula. As a result of calculation of Cochran's formula, minimum sample size for the study was determined to be 267.

Data was collected by a 5 point Likert-type survey developed specifically for purposes of this study. The Nurse Practitioner Satisfaction Survey (NPSS) (Appendix C) is composed of 28 Likert-type items compiled with the intent of including the specific concepts viewed as instrumental to the development of overall client satisfaction with care. The survey additionally included items related to patient demographics, current and previous health status, past interactions with healthcare providers, and general opinion of healthcare and education received in the past.

A total of 300 subjects were asked to complete the survey following completion of their visit with the nurse practitioner during the time period extending from January 3, 2005 through February 17, 2005. Subjects included employees and family members over the age of 18 of employees of the study hospital. Subjects were allowed to remain in the examination room following the visit for purposes of anonymity and confidentiality in completing the survey. Confidential receptacles were provided in two separate locations in the clinic for purposes of anonymous collection of completed surveys.

Summary of Findings

Objective One

Findings of Objective One indicated that the greatest number of patient respondents were between 26 and 35 years of age, ($n = 87$, 31%) and 36 and 45 years of age,

(n = 74, 26.3%). Female was the most frequently reported gender, (n = 246, 83.4%).

The majority of respondents indicated their marital status as either married or cohabitating, (n = 195, 67.2%) or single or never married, (n = 49, 16.9%). The majority of the adult client study participants reported their race as “Caucasian” (n = 230, 79.3%). The second highest group indicated their race as “African American” (n = 57, 19.7%). A Bachelor of Arts or Science was reported by the highest number of respondents, (n = 90, 30.3%), while the second highest group reported “Some college” as the highest level of education attained, (n = 70, 23.6%).

The majority of respondents reported being insured by the study hospital’s health plan, (n = 215, 75.7%), and the most frequent income range reported was between \$25,001 and \$50,000, (n = 136, 48.1%). The employment status category most frequently reported by the participants was “Full time,” (n = 216, 74.2%), with “Part time” employees comprising 14.1% (n = 41) of the study sample.

The majority of adult clients presenting for nurse practitioner provided primary health care services indicated that they were employees of the study hospital, (n = 246, 82.8%), while 46 subjects (15.5%) reported being family members of employees. Of the sample, a total of 129 (44.3%) respondents reported being “A little ill,” while 259 (89.9%) reported being “Not injured.”

One hundred and eighty-six (n = 186, 62%) of the respondents indicated a total of 241 medication dependent health problems, while 38% (n = 114) indicated no current health problems necessitating medication administration. The most commonly reported health alterations were high blood pressure, (n = 47, 15.7%) and depression or anxiety,

(\underline{n} = 34, 11.3%). Of the respondents, 75.5% (\underline{n} = 188) reported taking one or more prescription medications per day.

The highest number of health care provider visits within the past year reported by the respondents were to physicians, (\underline{n} = 293), while the second largest number of patient visits were to nurse practitioners, (\underline{n} = 276). The majority of respondents, (\underline{n} = 265, 89.2%) reported having seen the nurse practitioner in Employee Health Services at the study hospital between one and five times within the previous year. Additionally, the majority of respondents, (\underline{n} = 206, 69.4%) reported being most satisfied with health care visits to a nurse practitioner, while 89 (30%) reported being most satisfied with visits to a physician. Respondents also indicated that nurse practitioners (\underline{n} = 232, 79.5%) had provided the best health education, while 20.2% (\underline{n} = 59) reported receiving the best health education from physicians.

Objective Two

Findings for Objective Two revealed that the three factor model was responsible for explaining 70.77% of the variance in patient satisfaction. Within this model Factor One consisted of 18 variables with loadings ranging from .916 to .391 and was assigned the label of “General Satisfaction.” Six variables loaded on Factor Two with values ranging from .888 to .435. This second factor was labeled “Communication.” Factor Three contained four variables with loading values ranging from .748 to .535, and was labeled “Scheduling.”

Patient satisfaction subscale scores were calculated from responses of participants on the 18 items loading on Factor One, “General Satisfaction.” Loading values for all 18 variables loading on Factor One were noted to be negatively skewed, with skewness

values ranging from -1.298 to -6.862. Kurtosis values for responses to the 18 variables ranged from 1.0098 to 58.902. The mean general patient satisfaction subscale score for the sample was determined to be 86.86 ($n = 288$) out of a possible score of 90.0

Objective Three

Objective Three findings revealed that the only statistically significant differences in patient satisfaction subscale scores noted were in the “Marital status” category where “Single or never married” ($n = 44$, $M = 83.34$, $SD = 12.828$) individuals had statistically significant differences in satisfaction scores than individuals who reported being “Married or cohabitating,” ($n = 190$, $M = 87.66$, $SD = 6.240$). Welch test analysis, $7.952(40, 20.353)$, $p = <.001$ indicated a difference in the marital status category. Subsequent Scheffe posthoc analysis revealed that scores for “Single or never married” respondents were lower and significantly different from “Married or cohabitating” individuals.

No statistically significant differences, $t = .599(282)$, $p = .549$, in patient satisfaction subscale scores existed between males, ($n = 49$, $M = 86.61$, $SD = 4.765$) and females, ($n = 235$, $M = 87.23$, $SD = 6.819$). Additionally, no statistically significant differences between racial groups, $t = .466(277)$, $p = .642$, were demonstrated between the regrouped dichotomous categories Non-Caucasians, ($n = 55$, $M = 86.46$, $SD = 7.591$) and Caucasians, ($n = 224$, $M = 86.99$, $p = 7.745$). No statistically significant differences were noted between the age subcategories, Welch statistic = $1.707(4, 84.264)$, $p = .156$; although individuals aged 56 years and older ($n = 19$, $M = 88.74$, $SD = 4.094$) had the

highest scores, while the 18 to 25 year age group, ($n = 34$, $M = 83.12$, $SD = 16.821$) reported the lowest satisfaction scores.

No statistically significant differences between education levels of respondents was demonstrated by the study, Welch statistic = 1.429(8, 15.804), $p = .259$. Those with a Masters level education were noted to have the highest general satisfaction scores, ($n = 18$, $M = 88.67$, $SD = 1.680$), while those with a Vocational or Technical school education were noted to have the lowest scores, ($n = 18$, $M = 83.95$, $SD = 16.758$).

No statistical significant differences were noted between groups based on type of health insurance coverage. Those participants reporting “Aetna” as their insurer were noted to have the highest general satisfaction scores, ($n = 2$, $M = 90.00$, $SD = .000$). When grouped into the dichotomy “Study health plan insurance,” ($n = 209$, $M = 87.15$, $SD = 6.652$ and “Other health plan insurance,” ($n = 66$, $M = 86.52$, $SD = 9.487$), no statistically significant differences between groups were noted, $t = .608(273)$, $p = .543$. Comparison of groups by level of “Yearly net income” also demonstrated no statistically significant differences between income level groups, Welch statistic = 1.804(4, 72.080), $p = .137$. Highest mean satisfaction scores were noted for the income level group “Greater than \$100,001,” ($n = 12$, $M = 88.67$, $SD = 2.060$), with the lowest scores attributed to those reporting annual incomes of “Less than \$25,000,” ($n = 56$, $M = 84.89$, $SD = 11.535$).

Similar non-significant differences were also noted between employee types of the patients responding. The Study Hospital employees were noted to have the highest reported patient satisfaction, ($n = 238$, $M = 87.01$, $SD = 6.950$), while contract employees had the lowest scores, ($n = 5$, $M = 85.80$, $SD = 6.573$). Although satisfaction scores

varied by types of employees presenting as patients, no statistically significant differences between groups was noted, $F = .347(2, 283)$, $p = .807$. No statistically differences, $F = .460(4, 275)$, $p = .765$, were likewise demonstrated between the various employment status groups. The highest satisfaction scores were noted by “PRN employees,” ($n = 21$, $M = 88.33$, $SD = 2.708$), with the lowest noted for “Part time employees,” ($n = 21$, $M = 85.64$, $SD = 4.509$).

Additionally, no statistically differences were noted between patient subjective ratings of the degree of illness, $F = 1.046(3, 276)$, $p = .373$, or injury, $F = .278(2, 274)$, $p = .750$, experienced upon presentation to the clinic health care visit.

Objective Four

Findings for Objective Four are based on multiple regression analysis employing dummy coding of the selected demographic variables of gender, age, income, and highest level of education completed as predictor variables, and the three identified latent constructs or subscales representing general, communication, and scheduling satisfaction as dependent variables for the formulation of three separate multiple regression equations. Results demonstrated that models did indeed exist which explained a significant portion of the variance in the three latent factor subscales employed as dependent variables.

General Satisfaction Subscale Score

A model was found that explained a significant portion of the variance in general satisfaction from the dummy coded demographic variables of gender, age, income, and highest level of education completed. Of the demographic characteristics analyzed, the educational level “Some college,” $F = 5.364(1, 252)$, $p = .021$, was determined to be a

significant predictor of the general patient subscale satisfaction score. These results indicated that general satisfaction scores for subjects reporting having attended some college were -2.243 points lower than those reported for the other educational levels. The final regression equation was determined to be $\hat{y} = 87.727 - 2.243$.

Communication Satisfaction Subscale Score

A model was also found that explained a significant portion of the variance in satisfaction with the communication aspects of the nurse practitioner interaction from the selected dummy coded demographic variables. The educational level "Masters degree," $F = 5.829(2, 259)$, $p = .003$, and the age group "18 to 25," $F = 6.844(1, 260)$, $p = .009$, were noted to significantly impact communication subscale scores through the calculation of the following equation: $\hat{y} = 28.260 - 1.194 + 1.387$. Being a member of the 18 to 25 year age group resulted in a decrease in communication satisfaction subscales scores of -1.194, while being a member of the Masters level educational level resulted in an increase in scores of 1.387 points.

Scheduling Satisfaction Subscale Score

The model found which explained a significant portion of the variance in scheduling satisfaction subscale scores resulted in the regression equation, $\hat{y} = 19.502 - .954$. A single statistically significant predictor variable, being a member of the 18 to 25 year old age group, resulted in a decrease in scheduling satisfaction scores of -.954, $F = 11.195(1, 260)$, $p = .001$, while being a member of another age group resulted in scheduling satisfaction scores which were .954 points higher than if a member of the 18 to 25 year old age group.

Conclusions, Implications, and Recommendations

Conclusion One

The patient population studied demonstrated overall high levels of satisfaction with primary health care services delivered by a nurse practitioner in the occupational setting. Mean responses for each of the 28 items comprising the 5 point Likert-type Nurse Practitioner Satisfaction Survey ranged from 4.20 to 4.91, reflecting overall high satisfaction levels with all aspects of the nurse practitioner health care visit.

These findings support the conclusions by Mundinger et al. (2000), Reveley (1998), Myer et al. (1997), Feldman et al. (1987), and Rhee and Dermeyer (1995) which demonstrated high overall patient satisfaction with health care visits to nurse practitioners. Based on these conclusions, a recommendation to expand the concept of nurse practitioner employee health clinics to various other business, industrial, academic, and professional occupational settings is made by the researcher. Additional recommendations include further validation of patient satisfaction with nurse practitioners in such settings.

Conclusion Two

This study employed quantitative data collection and analysis techniques to measure patient satisfaction through development and utilization of the Nurse Practitioner Satisfaction Survey (NPSS). As the concept of patient satisfaction with health care services is complex and multifaceted, the possibility that the quantitative instrument utilized failed to capture intricate and individual patient perceptions of satisfaction with care is acknowledged. A recommendation is therefore made to further expand the assessment of the intricacies involved in the formulation of favorable impressions of

patient satisfaction through qualitative research means. This recommendation is congruent with those of Turner and Pol (1995), which suggest instrumentation challenges in quantifying patient perceptions, beliefs, and expectation and further recommend assessment through qualitative research means.

Conclusion Three

Over 99% ($n = 297$) of the population studied reported completion of either a high school or a General Educational Development (GED) degree. One hundred and forty-five respondents (48.9%) reported attaining an Associate Degree or higher from an institutional of higher learning. Findings of the study additionally included the significance of the single educational level “Some College” in predicting patient satisfaction with nurse practitioner delivered primary health care, ($F = 5.364(1, 252)$, $p = .021$). Being a member of the educational level group “Some College” resulted in a decrease in the general satisfaction subscale score of -2.243 , while not being a member of this group resulted in higher general satisfaction subscale scores, $t = -2.316(252)$, $p = .021$

Additional findings regarding the influence of educational level on patient satisfaction with nurse practitioners included the positive effect of having a “Masters level” education on satisfaction with overall communication aspects of the nurse practitioner encounter. Subjects who reported being members of the “Masters level” education group were noted to demonstrate communication subscale satisfaction scores which were 1.387 points higher than those of other educational levels, $t = 2.172(259)$, $p = .031$.

This finding corroborates outcome results by Knudtson (2000) and Phillips et al. (2000) which demonstrated a positive predictive ability of higher levels of education in determining increased satisfaction by patients. The finding however disputes findings by Wilson (1999) that determined no statistically significant differences in satisfaction as a result of client age, gender, age, employment status, educational level, or marital status. Differences noted between Wilson's (1999) study and this study include Wilson's (1999) study consisting of a sample size of 96, compared to a sample size of 300 utilized for this research. Additionally, Wilson's (1999) study was conducted in the Anchorage and Eagle River regions of Alaska, a geographical region of the United States noted to exhibit a strikingly physical and cultural divergence from that of South Louisiana. The study consisted of 12 Likert-type variables measuring satisfaction with nurse practitioner delivered care, compared to the 28 Likert-type variables utilized in this study. Wilson's (1999) research was also noted to have been conducted among patients of a nurse practitioner owned and operated clinic, representing yet another methodological dissimilarity from this study.

The implication of this finding is that the majority of patients presenting for health care services by the nurse practitioner were capable of making intelligent, informed decisions regarding choice and type of health care provider. The subjects studied viewed the provision of primary health care by nurse practitioners as an acceptable alternative to physician provided care and voluntarily chose a nurse practitioner for the provision of their personal acute and emergent health care needs. These findings are postulated to perhaps be indicative of an enhanced knowledge or appreciation of the value of health

maintenance and the adoption of a proactive approach to health care and wellness exhibited by those with higher levels of education.

Further implications of this finding include the general acceptability of primary health care by nurse practitioners among employees who had attained higher levels of education and serves as a motive and basis for exploration into the feasibility of on site nurse practitioners in various workplace settings by employers.

Conclusion Four

Overall the respondents demonstrated high levels of health. The majority of respondents of the Nurse Practitioner Satisfaction Survey reported being either “Not ill” or a “Little ill,” (n = 183, 62.9%) upon presentation to the clinic. Furthermore, a total of 114 (38%) of the sample respondents indicated that they currently experienced no health problems necessitating daily medication administration.

These findings corroborate findings by Powers and Bendall-Lyon (2003) and Branson, Badger, and Dobbs (2003) which demonstrated that highly satisfied patients tended to view their personal health status more positively, as well as those by Renzi et al. (2001) which correlated poor patient satisfaction with poor health outcomes. Based on this finding a recommendation is made by the researcher to explore levels of nurse practitioner patient satisfaction in populations of patients of varied and altered states of health to determine if findings continue to corroborate those from relatively healthy populations.

Conclusion Five

A major premise resulting in the inception and approval by administration of the Employee Health Services Clinic at the Study Hospital was its anticipated cost

effectiveness to the organization. Although patient satisfaction with services has successfully been documented and established, no study or statistical tracking mechanism thus far has demonstrated success in quantifying the specific financial cost savings to the institution. Specifically, quantification of work hour and other financial savings as a result of having onsite access to a nurse practitioner is currently unavailable. A recommendation to research, develop, and implement mechanisms such as financial impact studies is therefore made by the researcher to document the economic impact and benefit to self insured organizations of having onsite access to nurse practitioner provided primary health care as a first line medical resource for facilitated entry into the health care system.

This conclusion corroborates findings by the United States Congress, Office of Technology Assessment on Nurse Practitioners, Physician's Assistants, and Certified Nurse Midwives (1986), Hayes (1985), as well as those of Sherwood et al. (1997), which describe the positive financial impact exerted on the national health care system by nurse practitioners. These studies all demonstrate the tremendous financial savings and cost benefits realized by utilizing mid level providers such as nurse practitioners in the delivery of primary health care services. As health care costs continue to rise and as the population of the United States continues to age, the recommendation to explore the economic effectiveness of onsite nurse practitioner primary health care services to various occupational settings is made by the researcher.

Conclusion Six

The majority of patients presenting for nurse practitioner delivered health care services ($n = 246$, 82.8%) were employees of the Study Hospital, thus demonstrating the

popularity of onsite healthcare provider access and utilization. As mentioned in Conclusion One, responses to the 28 items comprising the 5 point Likert-type Nurse Practitioner Satisfaction Survey ranged from 4.20 to 4.91, reflecting overall high satisfaction levels the onsite nurse practitioner health care visit. The majority of subjects were also insured by the Study Hospital's health insurance plan, ($n = 215$, 75.7%).

These findings corroborated the research outcome conclusions of Dellana and Glascoff (2001) who found that facilitated access to care, health care resource availability, and financial aspects of care according to type of health insurance plan were determinants of patient approval with health care services and consequently of the likelihood of patients to seek medical care and wellness interventions in a timely fashion. Conclusions from this finding further substantiate the recommendation that businesses, industrial enterprises, other professional institutions, and employers explore the feasibility and benefit of providing on site occupational health care access by nurse practitioners to employees.

Additionally, 46 (15.5%) subjects were adult family members of employees, representing a growing popularity and acceptability of the service among family members. This finding further substantiates the general acceptability of on site health care access and further validates the previous recommendation to generalize the concept of work place access to nurse practitioner provided health care to other occupational arenas. A further recommendation is additionally made to continue to facilitate, enhance and promote overall employee and family wellness through maintaining the expansion of health care service offerings to family members of employees.

Conclusion Seven

Although statistical analysis revealed no significant differences in patient satisfaction between the various age groups, mean general satisfaction subscale scores ranged from the highest demonstrated by the 56 and older age group ($n = 19$, $M = 88.74$, $SD = 4.904$) to the lowest demonstrated by the 18 to 25 year olds ($n = 34$, $M = 83.12$, $SD = 16.821$). Additional findings included a negative predictive ability of being a member of the 18 to 25 year old age group on both communication and scheduling satisfaction subscale scores. If a member of the 18 to 25 year old age group, scores on the communication satisfaction subscale were noted to be -1.194 points lower than not being a member of this age group, $t = -2.417(260)$, $p = .016$. Correspondingly, if a member of the 18 to 25 year old age group, scheduling satisfaction subscales scores were noted to be $-.954$ points lower, demonstrating less satisfaction than those who were not members of this age group, $t = -3.346(260)$, $p = .001$.

This finding disputes finding by Knudtson (2000), Benkert et al. (2002), and Phillips et al. (2000) that demonstrated higher overall satisfaction with nurse practitioners among younger age groups studied. Knudtson's (2000) study was noted to differ from this study by having utilized a sample size of 93, and having been conducted in primarily a rural health setting. The Benkert et al. (2002) study was noted to have utilized a sample size of 907 patients from seven nurse managed clinics owned and operated by four different academic institutions' schools of nursing and was conducted over a time period exceeding three years duration. This study was also noted to have included pediatric patients of all ages, with parents completing surveys when the child was unable to do so. Phillips et al. (2000) conducted research regarding patient perceptions of nurse

practitioners utilizing a 10 item Likert-type survey and a sample size of 238 derived from four clinical sites in the Northeastern United States.

The finding of lower patient satisfaction among the 18 to 25 year old age group in this study conflicts also with findings of Wilson (1999) and Marsh (1999), who found no statistically significant differences in satisfaction based on client age. As previously noted Wilson's (1999) study was conducted in nurse practitioner owned and operated clinical sites using a sample size of 96 consisting of clients from a geographic region of the United States not to differ appreciably from that of South Louisiana. The Marsh (1999) study was also noted to differ from this study in that it consisted of a sample size of 167 patients over an 18 month time period from a university based managed care clinical setting for the medically indigent. Additionally the study involved randomizing 92 of the patients to care delivered by nurse practitioners, while 66 patients were randomized to physician provided health care.

Findings corroborate outcomes by Roblin et al. (2004) that demonstrated higher satisfaction with visits by older patients, and those of Green (2002) that demonstrated lower satisfaction with nurse practitioners among the age group 18 to 25 year olds. Of interest is the finding that both the Green (2002) and this study were conducted in the same state in the Southern portion of the United States, and perhaps represents a cultural or geographic phenomenon associated with the 18 to 25 year old subgroup studied in this geographic region. Although demonstrating geographic similarities, Green's (2002) study was noted to differ from this study in that her sample consisted of patients of nurse practitioners in rural health clinic settings, while this study consisted of patients having occupational access to nurse practitioner delivered health care.

Recommendations based on this finding include further in depth analysis into perceptions resulting in the formulation of opinions regarding nurse practitioner, health attitudes, and overall general satisfaction with life among the 18 to 25 year olds. Further recommendations include the expansion of research into nurse practitioner patient satisfaction to the 12 to 17 year age groups to determine if similar predictors of patient satisfaction exist. A final recommendation is further made to compare satisfaction levels with nurse practitioners among the 18 to 25 year old populations within different geographic regions of the United States as well as different healthcare settings.

Conclusion Eight

Findings of the study demonstrated statistically significant differences in general satisfaction subscale scores between respondents indicating their marital status as “Single or never married,” and those responding as “Married or cohabitating,” Welch statistic = 7.952(4, 20.353), $p = <.001$. Married and cohabitating subjects ($n = 190$, $M = 87.66$, $SD = 6.240$) reported statistically higher general satisfaction subscale scores than those reporting their marital status as “Single or never married,” ($n = 44$, $M = 83.34$, $SD = 12.828$). Since the literature reviewed revealed no mention of marital status as an indicator of patient satisfaction, a recommendation based on this finding includes the expansion of research exploration into specific determinants of satisfaction with nurse practitioner provided health care among individuals of varying marital and living accommodation statuses.

Conclusion Nine

Findings of the study demonstrated highest mean satisfaction subscale scores for those indicating incomes as “Greater than \$100,001,” ($n = 12$, $M = 88.67$, $SD = 2.060$),

while the lowest means subscale scores were noted for those reporting yearly net incomes of “Less than \$25,000,” ($n = 56$, $M = 84.89$, $SD = 11.535$). Although differences in satisfaction scores were demonstrated by the study, Welch statistic = 1.804(4, 72.080), $p = .137$, differences in satisfaction scores were did not demonstrate statistical significance. These findings are incongruent with those of Branson et al. (2003), and Philips et al. (2000) which demonstrated higher overall satisfaction with nurse practitioners among those respondents reporting higher incomes.

Conclusion Ten

As previously mentioned, patient satisfaction with the communication aspects of the nurse practitioner interaction were noted to be high with mean scores on the six items comprising the 5-point Likert-type subscale noted to range from 4.84 to 4.20. The lowest item on the scale receiving the mean score of 4.20 elicited the patients’ degree of agreement with the statement, “I usually leave my MD visit with all questions answered.” These findings corroborate those of Byrne et al. (2000), Chang et al. (1999), and Greeneich (1995), which concluded that patient satisfaction was positively influenced by communication style, health information, and explanations offered by nurse practitioners when compared to other health care providers.

Implications of this finding include the recommendation to further investigate those specific aspects of interpersonal communication occurring at the nurse practitioner and patient interface in order to investigate, identify, and determine specific determinants of increased satisfaction.

Conclusion Eleven

The study demonstrated that the Nurse Practitioner Satisfaction Survey developed specifically for use in this study was reliable in determining patient satisfaction with general, communication, and scheduling aspects of the nurse practitioner visit in the occupational setting of a not for profit hospital in the Southern portion of the United States. Reliability measurements for the three subscales, general satisfaction, communication satisfaction, and scheduling satisfaction were .978, .828, and .759 respectively. These findings substantiate the future employment of the novel assessment instrument in measuring patient satisfaction in other primary health care settings.

The tool was successful in identifying three separate subscales which comprised overall patient satisfaction with nurse practitioners. The three latent factors identified included subscales related to satisfaction in general, the communication aspects of the nurse practitioner patient interaction, and the scheduling aspects of the nurse practitioner visit. The three-factor model utilized in this study resulted in a model that explained 70.77% of the variance in satisfaction. Eighteen variables with loadings ranging from .916 to .391 were noted to load on the first factor, general satisfaction. Six variables loaded on factor two with values ranging from .888 to .435. Factor three contained four variables with loadings ranging from .748 to .535. Only one variable appeared to load on all three factors with loading values of .391, .376, and .221 respectively.

The three factor model met the criteria of simple structure, high loadings, low crossloadings, was easy to interpret, appeared practical, and contained latent constructs which were easily labeled as factors indicating overall satisfaction, communication, and scheduling. The model that emerged as a result of this study was determined to

satisfactorily represent the broad concept of patient satisfaction with nurse practitioner provided primary health care services.

Findings of this study demonstrated overall high levels of patient satisfaction. Procedures for the study included the completion of the instrument by patients prior to leaving the clinical setting or exam room. This finding is consistent with that of Kinnersley et al. (2000) that demonstrated higher levels of patient satisfaction reported by respondents who completed the survey prior to leaving the clinic when compared to those completing the instrument at home.

Although the review of related literature revealed few predictive models of patient satisfaction with nurse practitioners, the emergence of the three-factor model was inconsistent with any of the models predicting patient satisfaction reviewed in the literature. Larrabee and Bolden (2001) found five factors of care responsible for high patient satisfaction. These included providing for needs, treating pleasantly, caring, being competent, and providing prompt care. This qualitative, descriptive study was noted however to have been conducted among hospitalized patients, and possessed limited ability to be generalized to the outpatient patient population or to patients of nurse practitioners.

In a study aimed at measuring a rural community's acceptance of nurse practitioners and physician assistants, Baer et al. (1999) found that access, competence, and trust emerged as predictors of patient satisfaction of midlevel health care providers. The instrument utilized in this study consisted of concepts which emerged following focus group discussion of health care concepts deemed as instrumental to the consumer in a rural health setting. Nine of the items on the instrument were noted to measure cost of

the health care visit and distance traveled to attend the visit, constructs that were determined to be of less significance in the determination of satisfaction among clients of this study's onsite occupational health setting.

Finally, Alexander (2001) determined that a single factor represented overall patient satisfaction with nurse practitioners. Methodological differences between the Alexander (2001) study and this study included Alexander's (2001) use of principal components factoring and this study's use of principal axis factoring and promax rotation as methods of exploratory factor analysis. Principal axis factoring as a common factor model differentiates between common and unique (specific and error) variances and utilizes only the common or shared variance in establishing correlations and determining factors. Principal components models make no such differentiation and include all sources of variance in extracting and determining factor structure.

Recommendations regarding the use of the newly developed Nurse Practitioner Satisfaction Survey include employment of the instrument in a variety of medical specialty areas including settings other than primary care in the occupational setting. Further research recommendations include the performance of a confirmatory factor analysis (CFA) on data from other specialty areas in order to determine if the three-factor model is applicable to settings other than that in which it was developed. As the sample size for this study was 300, this recommendation is further expanded to include both a comparison and a confirmatory factor analysis study in the same clinical setting using a data set that includes an additional 300 similar subjects, for a total of at least 600 subjects, in order to establish the validity of the three factor model in the primary health care occupational setting.

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Appendix A

Louisiana State University Institutional Review Board (IRB) for Protection of Human Subjects Approval Letter

IRB #: 2769 LSU Proposal #: _____ Revised: 06/11/2003

LSU INSTITUTIONAL REVIEW BOARD (IRB) for 578-8692 FAX 6792
HUMAN RESEARCH SUBJECT PROTECTION Office: 203 B-1 David Boyd Hall

APPLICATION FOR EXEMPTION FROM INSTITUTIONAL OVERSIGHT

Unless they are qualified as meeting the specific criteria of the Institutional Review Board (IRB) oversight, ALL LSU research projects involving living humans as subjects, or samples or data obtained from humans, directly or indirectly, with or without their consent, must be approved or exempted in advance by the LSU IRB. This Form helps the PI determine if a project may be exempted, and is used to request an exemption.

Instructions: Complete this form.

Exemption Applicant: If it appears that your study qualifies for exemption send:

- (A) Two copies of this completed form,
- (B) a brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts A & B),
- (C) copies of all instruments to be used. If this proposal is part of a grant proposal include a copy of the proposal and all recruitment material.
- (D) the consent form that you will use in the study

to: ONE screening committee member (listed at the end of this form) in the most closely related department/discipline or to IRB office.

If exemption seems likely, submit it. If not, submit regular IRB application. Help is available from Dr. Robert Mathews, 578-8692, irb@lsu.edu or any screening committee member.

Principal Investigator LUCIE J. AGOSTA Student? ☒ N
225-927-1644 (H) lagosta@lsu.edu HUMAN RESOURCE EDUCATION
Ph: 225-927-8419 (W) E-mail lucie.agosta@cox.net Dept/Unit AND WORKFORCE DEVELOPMENT

If Student, name supervising professor Lisanna Machtmes, PhD Ph: 225-578-7444
Mailing Address 7960 #8 WRENWOOD BOULEVARD, BATON ROUGE, LOUISIANA 70809
Project Title Patient Satisfaction with Nurse Practitioner Delivered Primary Health Care Services

Agency expected to fund project NONE

Subject pool (e.g. Psychology Students) WOMANS HOSPITAL EMPLOYEES AND ADULT SPOUSES/DEPENDENTS OF WOMANS HOSPITAL EMPLOYEES

Circle any "vulnerable populations" to be used: (children <18; the mentally impaired, pregnant women, the aged, other). Projects with incarcerated persons cannot be exempted.

I certify my responses are accurate and complete. If the project scope or design is later changed I will resubmit for review. I will obtain written approval from the Authorized Representative of all non-LSU institutions in which the study is conducted. Study exempted by

PI Signature [Signature] Date 09/27/04 (non-LSU institutions) _____
Louisiana State University
Institutional Review Board
203 B-1 David Boyd Hall

Screening Committee Action: Exempted ☒ Not Exempted ☐ Date 09/27/04 Paragraph _____

Reviewer Richmond Nelson Signature [Signature] Date OCT 1, 2004
Robert C. Mathews, Chair

Appendix B
Information and Consent Sheet

Information Sheet
Patient Satisfaction with Nurse Practitioner Delivered Primary Healthcare Services

Investigators:	<p>The following investigators are available for inquiries about this study.</p> <p>Monday-Friday 8am-4:30pm</p> <ul style="list-style-type: none"> • Lucie J. Agosta, ANP, FNP 225.924.8419 (W) 225.927-1684 (H) • Krisanna Machtmes, PhD 225.578.7844 <p>Major Professor Louisiana State University School of Human Resource Education and Workforce Development</p> <ul style="list-style-type: none"> • D. J. Scimeca, MD 225.924.8144 225.381.6253 <p>Medical Director Woman's Hospital Employee Health Services</p>
Purpose of the Research Study:	<p>To determine the level of patient satisfaction with primary healthcare services delivered by a nurse practitioner in an occupational/employee health setting. This is a study for a dissertation in the School of Human Resource Education and Workforce Development, Louisiana State University.</p>
Subject Inclusion:	<p>Adult employees and adult spouses/dependents of employees of Woman's Hospital, Baton Rouge, Louisiana, voluntarily presenting for healthcare services by a nurse practitioner</p>
Study Procedures:	<p>Participants will voluntarily complete a survey following completion of the visit with the nurse practitioner. Estimated time for completion-15 minutes. Survey designed to determine patient satisfaction, patient perceptions, and selected demographic data. Drop box for completed surveys in clinic waiting area.</p>
Benefits:	<p>Study may potentially generate valuable information concerning satisfaction and possible enhanced patient compliance with primary healthcare delivered by a midlevel, non-physician provider.</p>
Risks:	<p>The only study risk is the inadvertent and unintentional release of participation status. Every effort will be implemented to maintain anonymity regarding individual responses. Confidentiality of the study records will be maintained with secure files being kept with access only to the investigators.</p>
Right to Refuse:	<p>Participants may choose to not participate, as completion of the questionnaire is voluntary.</p>
Privacy:	<p>Results of this study may be published; however no names of otherwise identifying information will be included in publication. Your responses on the questionnaire will be anonymous.</p>
HIPAA	<p>Records that you give us permission to keep, and that identify you, will be kept confidential as required by law. Federal Privacy Regulations provide safeguards for privacy, security, and authorized access. Except when required by law, you will not be identified by name, social security number, address, telephone number, or any other direct personal identifier in records disclosed outside of Louisiana State University (LSU) and Woman's Hospital Employee Health Services. For records disclosed outside of LSU, you will be assigned a unique code number. Records will be stored in Employee Health Services under lock and key until successful graduation of the researcher. Records will be destroyed at that time.</p>

Consent:

I have read and understood the above description of this study and all questions have been answered. I may direct additional questions that I may have regarding study specifics to the investigators. If I have questions about subjects' rights or other concerns, I can contact Robert C. Mathews, Louisiana State University Institutional Review Board, (225) 578-8692 or Peggy Dean, Woman's Hospital Institutional Review Board at (225) 231-5359. I agree to participate in the study described above and my participation with the survey serves as my giving consent.

Appendix C

Nurse Practitioner Satisfaction Survey Instrument

Nurse Practitioner Satisfaction Survey

We are conducting a study of patient satisfaction regarding the use of nurse practitioners. The survey is completely confidential and only summary information will be reported in the study results. Thank you in advance for your help with this survey.

Please indicate your degree of satisfaction with the following statements:

"SD"= Strongly Disagree "D"= Disagree "A"= Agree "SA"= Strongly Agree "U"= Uncertain

Fill in the bubbles like this: ●

	SD	D	A	SA	U
1. Overall I was satisfied with my visit with the nurse practitioner (NP) -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I am likely to recommend the NP to others -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I am likely to schedule appointments with the NP in the future -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. The NP was not rushed -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I would rather see the NP than my regular physician -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I was able to schedule a convenient appointment with the NP. -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. When I feel the need to see a healthcare provider, I can get an appointment with the NP without a problem -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. The Woman's Hospital Employee Health clinic is easy to access -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Scheduling an appointment with the Woman's Hospital Employee Health Clinic NP is easier than scheduling with my usual physician -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. My NP is a skilled healthcare provider -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. My NP discusses methods other than medication to treat my problem -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. I am satisfied with how the NP treated me -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. I was satisfied with the amount of time the NP spent with me -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. My NP is caring -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. My NP is knowledgeable about health problems -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. I trust my NP -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. My NP knows when to refer to or consult with a physician -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. The NP listened to what I had to say -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. The NP was interested in my health concerns -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. The NP respected me -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

	SD	D	A	SA	U
21. I can easily talk to the NP about my health concerns -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. I understood what the NP explained to me -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. I understood what the NP taught me -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. The NP explained things in an understandable manner -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. I feel comfortable asking the NP questions -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26. I feel comfortable asking my personal physician questions -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27. I left the NP visit with all questions answered -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28. I usually leave my personal physician's visits with all questions answered	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please choose only one response for questions 29 and 30

29. From past experience, who do you feel has provided healthcare that you've been most satisfied with?

☐ Nurse Practitioner ☐ Physician ☐ Physician's Assistant

30. From past experience, who do you feel has provided you with the best health education?

☐ Nurse Practitioner ☐ Physician ☐ Physician's Assistant

31. Number of times in the past year that you have seen the NP in the Employee Health Clinic at WH:

☐ 1-5 ☐ 6-10 ☐ 11-15 ☐ 16 or more

Number of times in the past year that you have seen a:

32. Physician (MD)

☐ None
☐ 1-5
☐ 6-10
☐ 11-15
☐ 16 or more

33. Nurse Practitioner (NP)

☐ None
☐ 1-5
☐ 6-10
☐ 11-15
☐ 16 or more

34. Physician's Assistant (PA)

☐ None
☐ 1-5
☐ 6-10
☐ 11-15
☐ 16 or more

35. Gender

☐ Male ☐ Female

36. Patient Type

☐ Woman's Hospital Employee ☐ Family Member of Employee ☐ Contract Employee

37. Highest Education Level Completed

<input type="radio"/> Less than High School Degree	<input type="radio"/> High School Degree/GED	<input type="radio"/> Some Vocational/Technical School
<input type="radio"/> Vocational/Technical School Degree	<input type="radio"/> Some College	<input type="radio"/> Associate Degree (AD)
<input type="radio"/> Bachelors Degree (BA/BS)	<input type="radio"/> Masters Degree (MA/MS)	<input type="radio"/> Doctoral Degree

38. Age

☐ 18-25 ☐ 26-35 ☐ 36-45 ☐ 46-55 ☐ 56-65 ☐ 66-75 ☐ 76-85 ☐ 86 and older

39. Race

- ☐ African American ☐ Hispanic
☐ Asian ☐ Other (please specify):
☐ Caucasian (white) _____

40. Employment Status

- ☐ Unemployed ☐ PRN/ As Needed
☐ Full Time ☐ Contract
☐ Part Time ☐ Retired

41. Health Insurance

- ☐ Aetna ☐ State Employees Group
☐ Blue Cross Blue Shield ☐ United Healthcare
☐ Cigna ☐ Woman's Hospital Health Plan
☐ Medicare/Medicaid ☐ Other (please specify):
☐ Ochsner _____

42. Marital Status

- ☐ Single Never Married ☐ Married/Cohabiting ☐ Separated ☐ Divorced ☐ Widowed

43. How ill are you today?

- ☐ Very Ill ☐ Moderately Ill ☐ A Little Ill ☐ Not Ill

44. How injured are you today?

- ☐ Very Injured ☐ Moderately Injured ☐ A Little Injured ☐ Not Injured

45. What current health problems do you currently take medication for? Please check ALL that apply.

- ☐ High Blood Pressure ☐ Depression/Anxiety ☐ Asthma/Lung/Breathing Problems
☐ HIV/AIDS ☐ Heart Disease ☐ Cancer
☐ Diabetes/High Blood Sugar ☐ High Cholesterol ☐ Thyroid Problems
☐ Other

46. Number of prescription medications that you currently take:

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47. Your yearly net (take home) income

- ☐ <\$25,000 ☐ \$25,001 - \$50,000 ☐ \$50,001 - \$75,000 ☐ \$75,001 - \$100,000 ☐ >\$100,001

Vita

Lucie Janelle Agosta was born in White Castle, Louisiana, on January 23, 1960. She is the daughter of Joan Brou Agosta and the late Sam Agosta. She graduated as valedictorian from White Castle High School in 1978 and attended Louisiana State University in Baton Rouge, Louisiana. In May, 1983 she received a Bachelor of Science Degree in nursing from Southeastern Louisiana University.

Following three years of employment as a Registered Nurse in labor and delivery at Earl K. Long Memorial Hospital in Baton Rouge, Louisiana, she attended The University of Texas Health Science Center at Houston, where in August, 1987 she received a Master of Science degree in High Risk Perinatal Nursing. Her research interests included topics within the perinatal field, and her master's thesis was titled "Primigravidas' Perceptions of the Fetus Following Ultrasonographic Visualization." She further completed a Post Master's Adult Nurse Practitioner program at Southeastern Louisiana University Graduate School of Nursing in May, 1999, and a Post Master's Adult to Family Nurse Practitioner program at Northern Kentucky University in August, 2000. The degree of Doctor of Philosophy will be conferred by Louisiana State University at the August 2005 commencement ceremony.

She is currently certified by the American Academy of Nurse Practitioners (AANP) as an Adult Nurse Practitioner, and by the American Nurses Credentialing Center (ANCC) as both an Adult and Family Nurse Practitioner. She additionally holds certification in Inpatient Obstetrics by the National Certification Company for the Obstetric, Gynecologic, and Neonatal Nursing Specialties (NCC), and is certified as both an Instructor and Instructor Trainer in the Association of Women's Health, Obstetrics,

and Neonatal Nursing's (AWHONN) Fetal Monitoring Principles and Practices Program. She also holds certification with the American Heart Association as a Cardiopulmonary Resuscitation Emergency Cardiac Care Provider and Instructor.

Professional experience includes employment with Woman's Hospital in Baton Rouge, Louisiana, since 1988, in a variety of clinical, educational, and administrative roles including Staff Registered Nurse in Labor and Delivery, Clinical Nurse Specialist (CNS) in Obstetrics, and Director of Perinatal Services. She proposed and developed the Employee Health Clinic at Woman's Hospital, where she is currently employed as an Adult and Family Nurse Practitioner. Her professional career additionally includes being employed as an Instructor by Our Lady of the Lake School of Nursing and Southeastern Louisiana University School of Nursing. She is a frequent presenter at professional health care conferences and educational gatherings, and has presented nationally at the American Academy of Nurse Practitioners 2003 National Conference, The University of Colorado's 2003 Nurse Practitioner Symposium, and the joint meeting of the Centers for Disease Control and Prevention (CDC) and National Institute for Occupational Safety and Health (NIOSH) in 2001.

She is a member of the Louisiana Association of Nurse Practitioners, Sigma Theta Tau International Honor Society of Nursing, and the American Nurses Association. She currently serves as a member of the Baton Rouge YWCA's Office of Women's Health Care Initiatives Advisory Committee, and is a Lifetime Member of the YWCA's Circle of Friends. She is also actively involved with the Baton Rouge Chapter of the March of Dimes Birth Defects Foundation as a Program Services Committee Member, and serves as the chairperson of Woman's Hospital's American Heart Association Committee.